

PROCEEDINGS

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COMMITTEE ON PUBLICATIONS

HERBERT FRIEDMANN, *Chairman*
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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

All correspondence should be addressed to the Biological Society of Washington, c/o U. S. National Museum, Washington, D. C.

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TABLE OF CONTENTS

Officers and Committees for 1951.....	iii-iv
Proceedings for 1951.....	v
Fleas Collected by the Chicago Natural History Museum Expedition to the Philippines, by Robert Traub.....	1-24
Occurrence and Identification of the Prairie Deer-Mouse in Central Maryland, by William H. Stichel.....	25-32
Two New Genera and a New Family of Tropical American Frogs, by Edward H. Taylor.....	33-40
A New Race of the Hawk-Owl, <i>Ninox scutulata</i> , from the Philippines, by H. G. Deignan.....	41-42
Two New Species of Lachnini (Aphididae) from Arizona, by F. C. Hottes and L. P. Wehrle.....	43-46
Arizona Aphididae, by F. C. Hottes and W. P. Wehrle.....	47-54
The Taxonomic Status of the Pocket Gophers, <i>Geomys bur-</i> <i>sarius</i> and <i>Geomys breviceps</i> , by Rollin H. Baker and Bryan P. Glass.....	55-58
General Notes	59-62
Carpenter Frog, <i>Rana virgatipes</i> , on the Coastal Plain of Maryland, by Brooke Meanley.....	59
<i>Eumeces laticeps</i> (Schneider) in the Alleghanian Zone of Maryland, by Brooke Meanley.....	59-60
<i>Natrix erythrogaster</i> in the Austro-Parian Zone of Mary- land, by Brooke Meanley.....	60
The Generic Name of the White and Scarlet Iises, by Kenneth D. Parkes.....	61
A New Race of Ptarmigan from Alaska, by Ira N. Gabriel- son and Frederick C. Lincoln.....	63-64
Four New Venezuelan Birds, by William H. Phelps and William H. Phelps, Jr.....	65-72
A New Alaskan Race of the Winter Wren, by Ira N. Gabrielson and Frederick C. Lincoln.....	73-74
New Neogaeon Water-striders (Hemiptera-Veliidae), by Carl J. Drake.....	75-82

A New White-winged Dove from Guatemala, by George B. Saunders	83-90
A New Gecko of the Genus <i>Gymmodactylus</i> from Serpent Island, by Arthur Loveridge	91-92
Fishes of the Tributaries of the Anacostia River, Maryland, by Henry F. Howden and Romeo Mansueti	93-96
A New Snake (<i>Tantilla</i>) from the Isthmus of Tehuantepec, Mexico, by Hobart M. Smith and Philip W. Smith	97-100
A New Lizard (<i>Sceloporus</i>) from Oaxaca, Mexico, by Philip W. Smith and Hobart M. Smith	101-104
Two New Mammals from Central Mexico, by Walter W. Dalquest	105-108
The Water Shrews of the Labrador Peninsula, by David H. Johnson	109-116
New Genera and Species of Chordeumoid Millipeds in the United States, and Notes on Some Established Species, by Nell B. Causey	117-124
A New Race of Dusky Grouse (<i>Dendragapus obscurus</i>) from the Great Basin, by William H. Behle and Robert K. Selander	125-128
<i>Allosebastes</i> , New Subgenus for <i>Sebastodes sinensis</i> , Scorpaenid Fish of the Gulf of California, by Carl L. Hubbs	129-130
New Records of Neotropical <i>Gentianaceae</i> —II, by Joseph Ewan	131-134
A New Blackbird (Aves) from Western China, by H. G. Deignan	135-136
On Two New <i>Colobognath</i> Millipeds and Records of Some Established Species from East of the Rocky Mountains, by Nell B. Causey	137-140
A New Halobatinid from Mexico (Hemiptera: Gerridae), by C. J. Drake and F. C. Hottes	141-144
A New Juniper Aphid from Western Colorado, by F. C. Hottes	145-146
Notes on the Genus <i>Rheumatobates</i> Bergroth (Hemiptera: Heteroptera), by C. J. Drake and F. C. Hottes	147-158
Index	159

The Committee on Publications declares that each paper of this volume was distributed on the date indicated on its initial page. The contents, minutes of meetings, and index for 1951 (pp. v-xi, 159-166) were issued on March 6, 1952. The title page and lists of officers and committees for 1951-1952 (pp. i-iv) were issued on November 19, 1951.

PLATES

- Plate I, page 2. *Stivalius pomerantzi* and *Stivalius robinsoni*.
Plate II, page 4. *Stivalius pomerantzi*.
Plate III, page 6. *Stivalius pomerantzi* and *Stivalius ralius*.
Plate IV, page 8. *Stivalius ralius*.
Plate V, page 10. *Thaumapsylla longiforceps*.
Plate VI, page 12. *Thaumapsylla longiforceps* and *Thaumapsylla breviceps*.
Plate VII, page 14. *Thaumapsylla breviceps*.
Plate VIII, page 30. Prairie Deer-Mouse Measurements.
Plate IX, page 100. *Tantilla triseriata*.
Plate X, page 123. *Trigenotyla parca*, *Trichopetalum lunatum*, and *Flagellopetalum stannardi*.
Plate XI, page 124. *Ofcokogona steuartae*, *Ofcokogona alia*, and *Tigannogona brownae*.
Plate XII, page 140. *Polyzonium bikermani* and *Polyzonium mutabil*.
Plate XIII, page 148. *Rheumatobates elanis* and *Rheumatobates crassifemur*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS

All meetings during 1951 were held in Room 43 of the U. S. National Museum except the 996th, 1000th, and 1001st, which were held in the National Museum auditorium.

995th Meeting—January 13, 1951

President Lincoln in the chair; 44 persons present.

New members elected: Earl Atwood, Vernon J. Tipton.

Informal Communications: F. C. Lincoln, Exhibition of new publication on migration of birds; S. F. Blake, Exhibition of new edition of Gray's Manual of Botany; F. R. Fosberg, Exhibition of new botanical works.

Formal Communications: Ronald Bamford, The Seventh International Botanical Congress at Stockholm; G. A. Llano, Linnaeus and Uppsala University.

996th Meeting—February 10, 1951

President Lincoln in the chair; 84 persons present.

New members elected: Adelle Heineke, Henry W. Setzer, Robert Traub.

Informal Communications: I. N. Hoffman, Note of a visit to Barro Colorado Island; F. C. Lincoln, Note on woodcock nesting in January in Louisiana.

Formal Communication: Alexander Wetmore, Barro Colorado Island, a jungle laboratory in the Panama Canal Zone.

997th Meeting—March 10, 1951

Joint meeting with Entomological Society of Washington.

President Lincoln in the chair; 55 persons present.

Informal Communication: William Anderson, Life history of monarch butterfly (colored film).

Formal Communications: D. J. Pletsch, The biological research stations of Japan; Robert Traub, New data from Malaya on the epidemiology of scrub typhus.

998th Meeting—April 14, 1951

President Lincoln in the chair; 40 persons present.

Informal Communications: S. F. Blake, Note on an unusual method of bathing of a song sparrow; F. C. Lincoln, Note on starlings bathing in cold weather.

Formal Communication: Gardner Bump, Upland game birds of the Near East.

999th Meeting—May 12, 1951

72d ANNUAL MEETING

President Lincoln in the chair; 40 persons present.

New members elected: Frederick M. Bayer, Fenner A. Chace, Jr., William K. Emerson, Paul L. Illg.

The reports of the Recording Secretary, Treasurer, Committee on Publications, and Committee on Communications were presented.

The following officers and members of Council were elected:

President, W. A. Dayton; *Vice Presidents*, H. G. Deignan, Hugh O'Neill, Herbert Friedmann, Alan Stone; *Recording Secretary*, S. F. Blake; *Corresponding Secretary*, H. A. Rehder; *Treasurer*, A. J. Duvall; *Members of Council*, L. W. Swift, D. H. Johnson, R. M. Gilmore, Howard B. Owens, Louise M. Russell.

It was voted to amend the By-Laws by raising the dues of non-subscribing and subscribing members from \$1.50 and \$3.00 to \$2.00 and \$4.00 respectively, to take effect in January 1952.

The President announced that a ballot will soon be sent out to the local membership for a vote on a proposal to change the meeting night from the second Saturday to the fourth Tuesday of the month.

The business meeting was followed by an open meeting, with the following *Formal Communication*: Francis Harper, Wildlife on the Barren Grounds of Keewatin.

1000th Meeting—October 23, 1951

Alexander Wetmore in the chair; 80 persons present.

New members elected: William H. Behle, Luis de la Torre.

Informal Communications: Alexander Wetmore, Recollections of early days of the Society; S. F. Blake, Historical sketch of the centurial meetings of the Society; T. S. Palmer, Early days of the Society; F. C. Lincoln, Reminiscences of

service as Treasurer for 25 years; H. C. Oberholser, Discussion of some early members of the Society, and its influence on biological work in the United States.

Formal Communication: Laurence Irving, Studies in Alaska upon physiological adaptation to cold.

1001st Meeting—November 27, 1951

President Dayton in the chair; 19 persons present.

New member elected: Lewis J. Stannard.

Informal Communication: W. A. Dayton, Note on blue jays eating pin oak acorns.

Formal Communication: Clarence Cottam, Biological background of certain conservation practices, especially waterfowl management.

1002d Meeting—December 20, 1951

(Owing to inclement weather the meeting was not held as scheduled.)

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FLEAS COLLECTED BY THE CHICAGO NATURAL HISTORY
MUSEUM EXPEDITION TO THE PHILIPPINES, 1946-1947*

BY ROBERT TRAUB, MAJOR, MSC

*From: Department of Parasitology
Army Medical Department Research and Graduate School
Army Medical Center
Washington 12, D. C.*

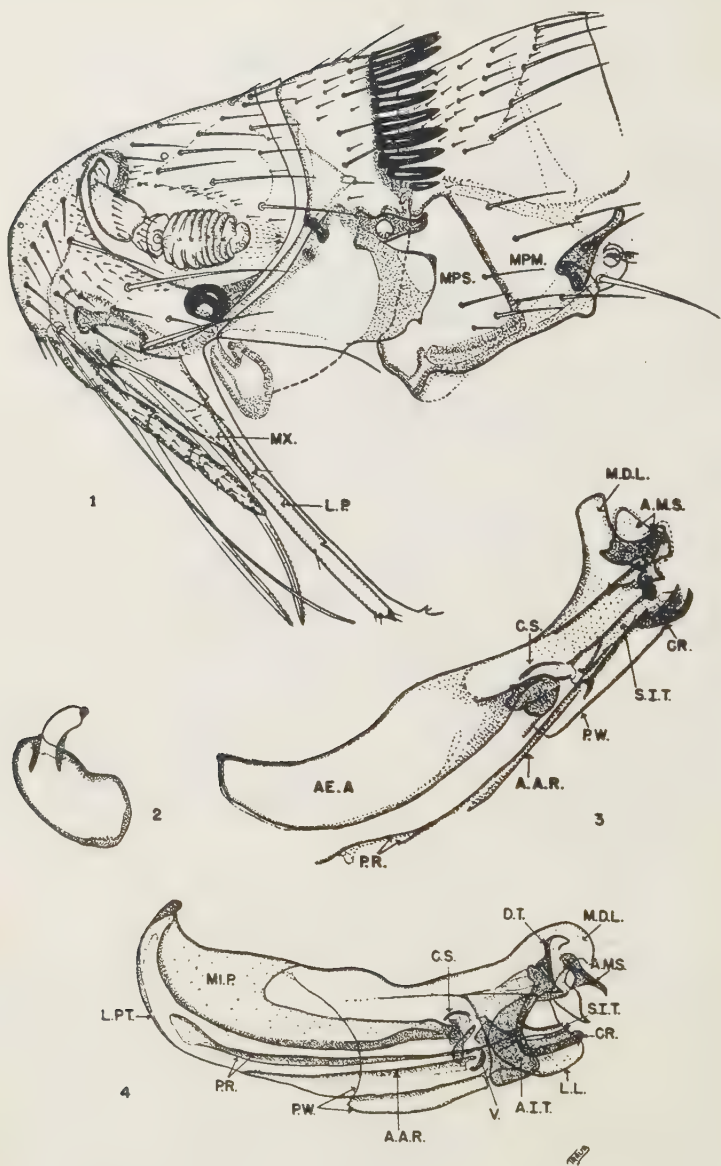
Our knowledge of the ectoparasite fauna of the Philippines is very scanty. Even such medically important insects as the fleas are poorly known, particularly from the higher elevations. Thompson (1), in 1938, listed only two species as having been recorded from the Philippines. The collection made by the Chicago Natural History Museum Expedition would therefore be appreciated for these reasons alone. Furthermore, a total of two new genera and five new species are represented, and the new forms present highly interesting adaptations, modifications and affinities. The two new genera are being described elsewhere (3, 4), and herein are described three new species. Once more I am indebted to Mr. Harry Hoogstraal, leader of the Expedition, and to the Chicago Natural History Museum, for some splendid contributions to the study of Siphonaptera.

Family Pygiopsyllidae
Subfamily Pygiopsyllinae

Stivalius pomerantzi sp. nov. (Figs. 1, 3, 5-10)

Diagnosis.—Distinct from known *Stivalius* in that the apex of exopodite is not produced caudad apically. Near *Stivalius robinsoni* (Rothschild 1905), but readily separated by the following characters: Anterior dorsal angle of metepisternum acute, not rounded. Eye somewhat reduced. Special spinose process below male ninth sternum absent. Distal arm of ninth sternum lacking spiniforms at midpoint of caudal margin. Sclerite below insertion of exopodite with long axis parallel to that of exopodite, not at right angles. Apical sclerite of median dorsal lobe of aedeagus apically truncate (fig. 3), not acute (fig. 4). Armature of inner tube of aedeagus reduced; not represented by a

*Published under the auspices of the Surgeon General, Department of the Army, who does not necessarily assume responsibility for the professional opinions expressed by the author.



FIGURES 1 & 3 *STIVALIUS POMERANTZI* N. SP.

FIGURES 2 & 4 *STIVALIUS ROBINSONI* (ROTHSCHILD, 1905)

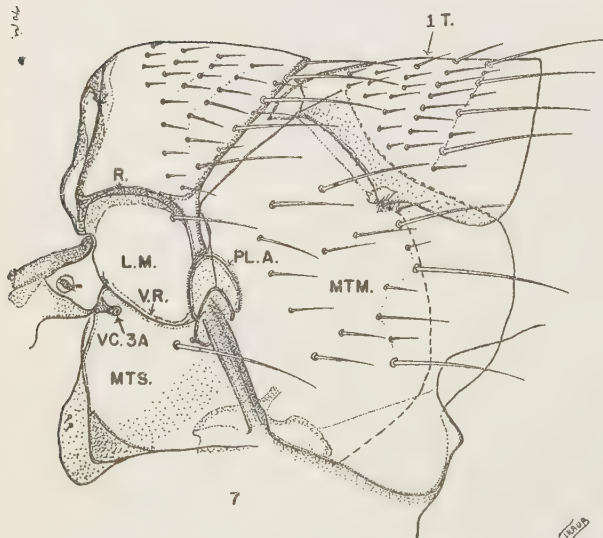
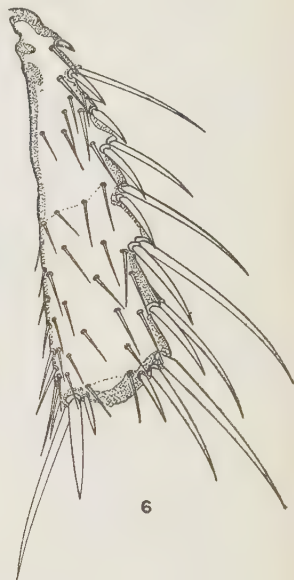
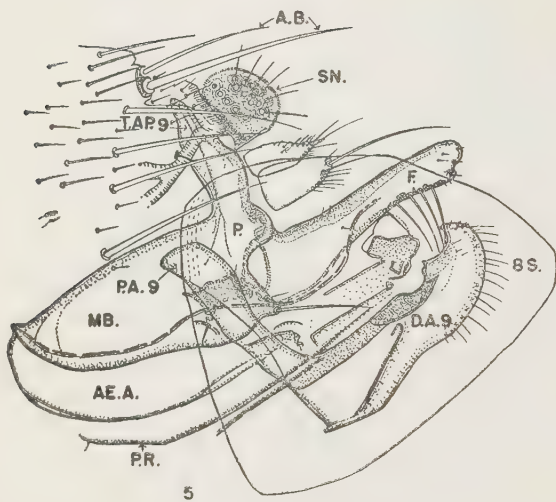
very large selerite flanking each side of the tube. Trough of aedeagal endchamber extending only to near apodemal strut, not to cephalic third of aedeagus.

Description

Head (fig. 1).—Frontoclypeal margin evenly rounded. Pores of microsetae scattered anterior and dorsal to first row of bristles, but those between the first and third rows with larger setae. First pre-antennal row with six or seven bristles, excluding two at insertion of maxillary palpi. Second row of four bristles, the most dorsal and most ventral the longest. Third row of four, the uppermost by far the longest. Fourth row consisting of a small bristle near eye and two long bristles near insertion of maxillary lobe. Eye somewhat reduced by virtue of a large ventral sinus extending about one-third its diameter, otherwise large; located near posteroventral corner of preantennal region of head. Genal process acuminate, enclosing a triangular unpigmented area near ventral margin of head. Maxillary lobe (*MX.*) extending to near apex of maxillary palpi. Labial palpi (*L.P.*) five-segmented, extending to apex of forecoxae. Bristles of second antennal segment very short except for one or two ventral ones which reach to midpoint of club. About 20 or 22 very small bristles along dorsal and posterior margin of antennal fossa. Postantennal region with three rows of bristles arranged 3(4)-5-6 with a large intercalary bristle near antennal fossa, between basal bristles of second and third rows.

Thorax.—Pronotum with three rows of bristles, the first row very incomplete. Pronotal comb with ten spines on a side. Mesonotum with five rows of bristles, the first two rows very small, somewhat irregular; bristles of the last two rows the longest, those of ultimate row twice as long as penultimate. Mesepisternum (*MPS.*) with four bristles all near or in ventrocaudal corner. Mesepimere (*MPM.*) with seven bristles arranged as in figure. Metanotum with four rows of bristles, the first row incomplete. Lateral metanotal area (fig. 7, *L.M.*) distinct, with dorsal ridge (*R.*) well sclerotized but with ventral ridge (*V.R.*) feeble; with a bristle where dorsal margin meets caudal margin. Pleural arch (*PL.A.*) at junction of metanotal ridge and pleural ridge, strongly convex, well-developed. Metepisternum (*MTS.*) with one bristle near dorsocaudal angle; anterodorsal angle acute and upturned; with an accessory link or vinculum (*VC.3A.*) near anterodorsal angle. Metepimere (*MTM.*) with 16 or 17 bristles on each side (including two or three small intercalary ones in last row) arranged as in figure.

Legs.—Metacoxa with mesal thin short bristles near anteroventral angle, and with two lateral bristles at insertion of trochanter. Profemur with about 12 thin, short lateral nonmarginal bristles; on each side a row of widely separated ventromarginal bristles, the proximal one fairly long, the others short except for subapical one and apical one. Mesofemur with a similar row of ventromarginal bristles but with apical three long. Metafemur as mesofemur in this regard. Metatibia (fig. 6) with but one unpaired dorsolateral large bristle and five pairs of such bristles; with three apical bristles below the last pair, that near dorsolateral margin the longest, the middle one next longest. Metatibia with about 27 small lateral bristles, excluding strictly marginal ones.



STIVALIUS POMERANTZI N. SP.

Measurements of tibiae and segments of tarsi (petiolate base deleted) shown in microns:

Leg	Tibia	Tarsal Segments				
		1	2	3	4	5
Pro-	243	104	82	66	47	100
Meso-	330	190	118	83	58	112
Meta-	450	363	220	134	82	120

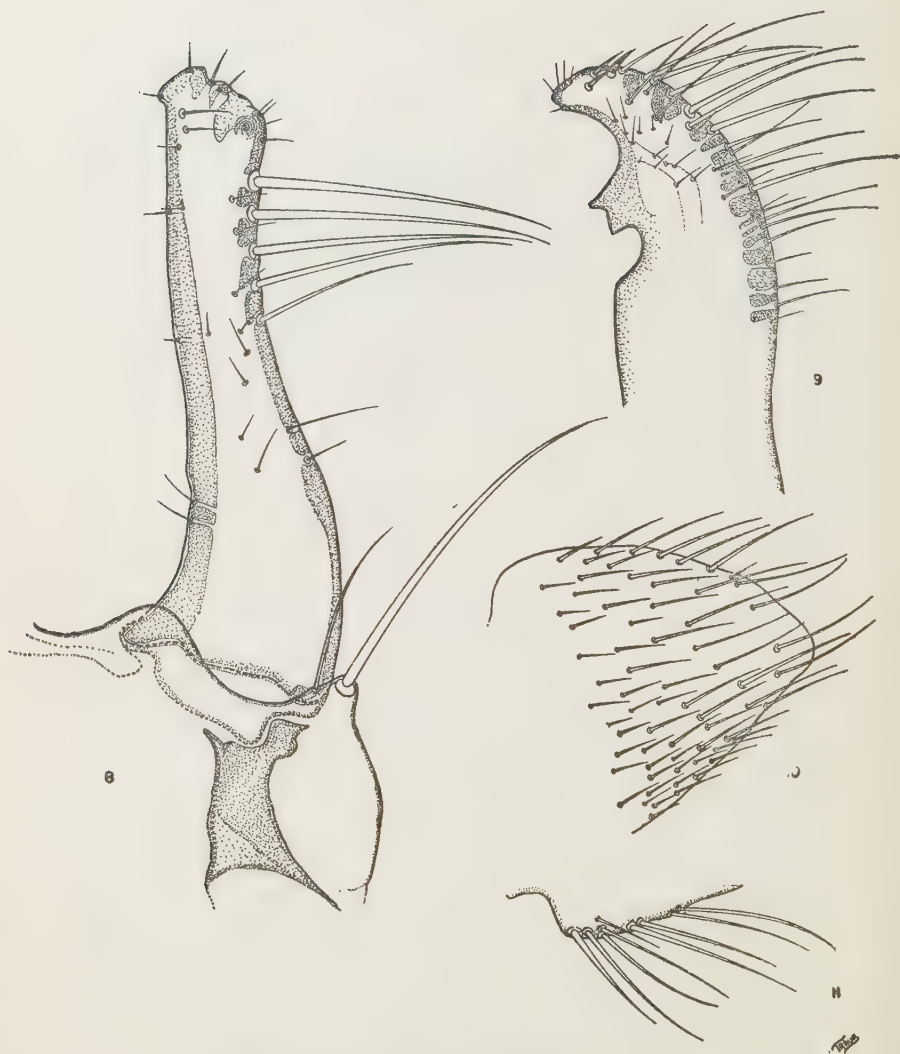
None of tarsal bristles reaching beyond apex of following segment. Fourth metatarsal segment only slightly wider apically than proximally. Fifth segment of pro- and mesotarsi with five lateral plantar bristles and four subapical ventral short stout bristles. Fifth metatarsal segment similar but with only two ventral subapical bristles.

Abdomen.—First tergum (fig. 7, *1T.*) with five rows of bristles, the first two incomplete. Terga two to six with one small apical tooth on each side. Basal sternum with a row of ventromarginal bristles, all but the last two or three very small. Typical terga with four rows of bristles, the first row very short; the long bristles of ultimate row much longer than those of other rows, this row extending ventrad of spiracle. Sterna three to six with four or five rows of bristles, the first two rows short. Upper antepygidial bristle (fig. 5, *A.B.*) slightly more than one-half length of ventral one.

Modified Abdominal Segments (fig. 5).—Eighth tergum reduced to a small indistinct area between antepygidial bristles and sensillum; with small thin bristles. Eighth sternum (*8S.* and fig. 10) very large, extending as far dorsad as near apex of exopodite, much more caudad than distal arm of ninth sternum, as far cephalad as apex of proximal arm of ninth sternum; with about 67 bristles arranged as in figure.

Immovable process of clasper (*P.* and fig. 8) reduced, not produced into a finger-like process; dorsocaudal margin sinuate, deeply concave at insertion of exopodite; with one long, one very short apical bristle; the largest apical bristle distal and ventral to ventroproximal angle of exopodite. Movable finger or exopodite (*F.* and fig. 8) very long, nearly four times as long as wide at base; with anterodorsal margin fairly straight for most of its length; apical margin convex near anterodorsal margin, then curving sharply proximad, sinuate; ventrocaudal margin proximally slightly convex, then concave. Exopodite with scattered short thin marginal bristles, especially apically and subapically. Exopodite with five long bristles well apicad of midpoint of ventrocaudal margin; the most proximal of these bristles the smallest; the bases of the bristles equidistant from each other; the most apical bristle inserted proximad of apex for a distance equal to about one-sixth of its length. At base of exopodite a conspicuous sclerite twice as long as broad; about as long as base of exopodite is broad; with margins concave. Manubrium (*MB.*) broad, almost half as broad as long, even broad near apex. Ninth tergum greatly reduced to an indefinite area between its apodeme and clasper lobe.

Ninth sternum roughly boomerang-shaped. Proximal arm of ninth sternum (*P.A.9*) truncate apically. Distal arm of ninth sternum (*D.A.9* and fig. 9) broad; apical half of ventral margin strongly convex; talon-like apically; dorsal margin biconcave, the lobe between the con-



FIGURES 8 TO 10 *STIVALIUS POMERANTZI* N. SP.
 FIGURE 11 *STIVALIUS RALIUS* N. SP.

cavities also with a sinus; with three subapical short stout bristles, almost suggesting spiniforms, on ventral margin; with about 20 long or longish ventromarginal bristles extending proximad nearly to midpoint; no bristles on dorsal margin, except for one subapical small one.

Aedeagal apodeme (fig. 3, *AE.A.*) slightly longer than aedeagus proper. Trough of endchamber extending slightly cephalad of apodemal strut. Wall of aedeagal pouch (*P.W.*) ventrally fairly well sclerotized. Median dorsal lobe (*M.D.L.*) bifid apically, each branch truncate, the upper one subvertical. Within each side of median dorsal lobe, a large apical sclerite (*A.M.S.*) which consists of a more heavily sclerotized mesal portion and a larger, more dorsal, lateral, less sclerotized section. Ventral portion of endchamber obscured by distal arm of ninth sternum in specimens extant. A sickle-shaped sclerite (*CE.*) denoting ventro-apical portion of crochets. Sclerotized inner tube (*S.I.T.*) straight, relatively unarmed, ventral in position. Apodemal strut supporting inner tube of usual type, but lobes not sharply differentiated. Crescent sclerite (*C.S.*) well developed. Penis rods (*P.E.*) uncoiled, short, not reaching to cephalic end of aedeagal apodeme; united for virtually all their length. Aedeagal apodemal rod (*A.A.R.*) present, arising from base of aedeagus. Vesicle (*V.*) at apex of *A.A.R.* fairly well-developed.

Tenth abdominal segment conspicuous by virtue of the large convex sensillum (fig. 5, *SN.*), which is almost as high as long. Dorsal lobe of proetiger with a subapical row of bristles and very small dorsomarginal ones. Ventral lobe of proetiger with ventromarginal bristles at apical half; the apical bristles very long.

Types.—Holotype ex *Rattus* sp., collected by Harry Hoogstraal, 20 August 1946. Philippine Islands: Mindanao, Davao Province, East Slope of Mt. McKinley, elev. 3300 ft. Deposited in Chicago Natural History Museum. Paratype male with same data in author's collection. Female unknown.

Remarks.—This species is named for Mr. Charles Pomerantz, who by his studies on mites and rickettsialpox contributed so much to the science of Parasitology.

Stivalius ralius sp. nov. (Figs. 11-16)

Diagnosis.—Agrees with *S. pomerantzi* in that the anterior dorsal angle of the metepisternum is acute and upturned, and the eye is somewhat reduced. Distinct in that there are two almost contiguous marginal sensory pits on clypeus, not one; the preantennal region bears 14 longish bristles, not 16; the mesepisternum three bristles, not four; the mesepisternum five, not seven, the metepisternum 11 longish bristles, not 13 or 14; the metatibiae bear two stout unpaired dorsomarginal bristles following the first paired set, not merely one; metatibia with only about 20 small lateral bristles; the labial palpi extend beyond apex of forecoxae instead of to near apex. Readily separated from *S. robinsoni* (Rothschild 1905) by the absence of a distinct sinus on the seventh sternum, by the fact that the tail of the spermatheca (fig. 15) does not distinctly enter the head and by the absence of the deep median dorsal sinus on the spermatheca (fig. 2, *S. robinsoni*).



STIVALIUS RALIUS N. SP.

Description.

Head, Thorax.—(Only salient differences from *S. pomerantzi* are included here. Distinctions believed to be secondary sexual characteristics, such as shape of head and length of antennae, are excluded.) Preantennal region with bristles arranged roughly 4-3-4-2-1, the median bristle at eye level the longest (fig. 12). Unpigmented portion of eye extending to about midpoint of eye. Postantennal bristles 5-6-7, and, in addition, a large intercalary bristle near midpoint of antennal fossa. Labial palpi extending to about middle of trochanter. Bristles of mesepisternum (fig. 13, *MPS.*) arranged 1-2; those of mesopimere (*MPM.*) arranged 3-2. Metepisternum (*MTS.*) with apparently two bristles, at least one very small. Metepimere (*MTM.*) with six bristles anterior to and/or slightly ventral to spiracle, and two longer ones caudad of spiracle; three additional bristles on ventral half.

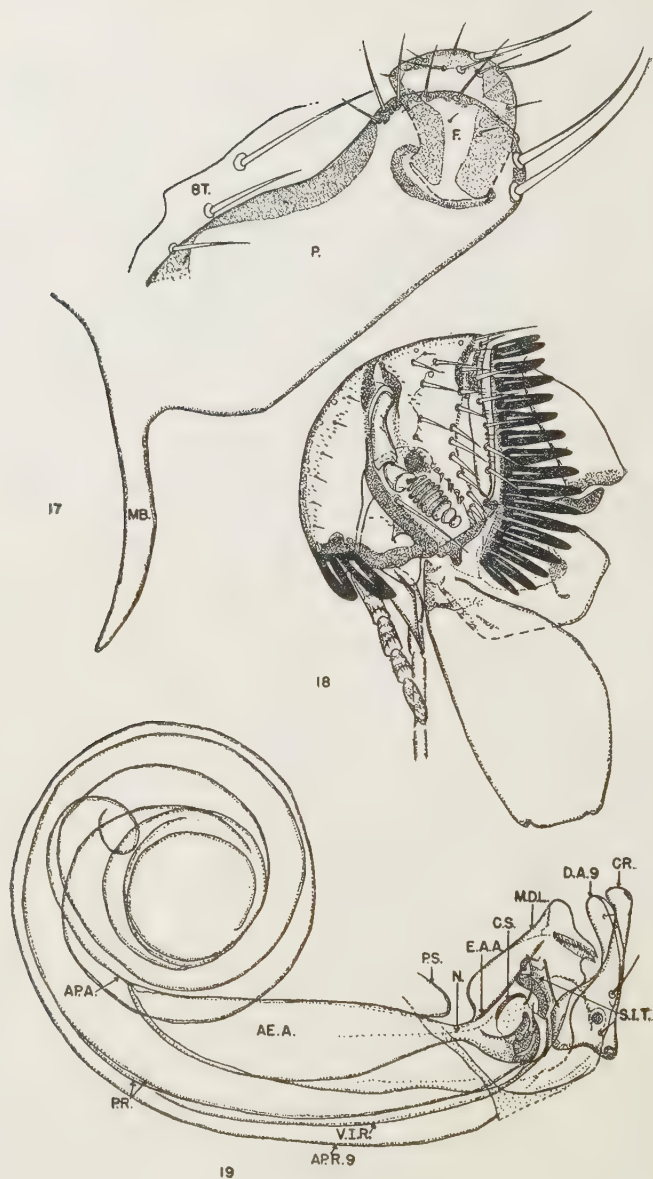
Legs.—Femora lacking a complete row of ventromarginal bristles, but with two proximal ventromarginal bristles on pro- and mesofemora, and three on metafemora. (In *Stivalius*, the females frequently have fewer such bristles than the males.) Dorsolateral bristles of metatibiae arranged 1-2-1-1-2-2-2-1-3. Measurements of tibiae and segments of tarsi (petiolate base deleted) shown in microns:

Leg	Tibia	Tarsal Segments				
		1	2	3	4	5
Pro-	220	110	74	63	46	95
Meso-	330	193	121	80	45	101
Meta-	495	372	240	137	78	110

Abdomen.—Basal sternum with but two or three apical marginal bristles. Upper antepygidial bristle about three-fourths length of lower bristle.

Modified Abdominal Segments (fig. 16).—Seventh sternum (*7S.*) with dorsal margin shallowly concave from near spiracle just above midpoint, then plunging vertically. Seventh sternum with more than 30 bristles in three or four irregular rows, the last row consisting of five or six very long bristles. Eighth tergum (*8T.*) with about 12 small bristles by spiracle; the rest of the bristles, over 40 in number, on the ventral half, most crowded into anteroventral portion; most conspicuous is a fringe of seven long stout submarginal bristles. Eighth sternum (*8S.*) very reduced, inapparent; with two or three small apical bristles. Dorsal anal lobe of proctiger with ten or twelve very small bristles and one long dorsomarginal bristle. Anal stylet (*A.S.* and fig. 14) more than four times as long as broad; sides subparallel and straight; with a very small bristle inserted dorsad of base of very long apical bristle. Ventral anal lobe (*V.A.L.* and fig. 11) not heavily sclerotized; with bristles distributed as follows: four at anterior angle, two median and two at three-quarters mark; with a small submarginal bristle above fourth bristle. Spermatheca (*SP.* and fig. 15) with head almost twice length of tail but scarcely broader at point of insertion; dorsal and ventral margins of head subparallel in the main.

Type.—Holotype a female *ex* undetermined species of *Apomys*, Philippine Islands, Mindanao, Davao Province, East Slope of Mt. McKinley,



THAUMAPSYLLA LONGIFORCEPS N.SP.

elev. 3100 ft. Collected by Floyd Werner, 23 September 1946. Deposited in Chicago Natural History Museum. Male unknown.

Remarks.—This specimen may prove to be the female of *S. pomerantzii* sp. nov. However, the differences listed in the diagnosis seem too great to be merely sexual.

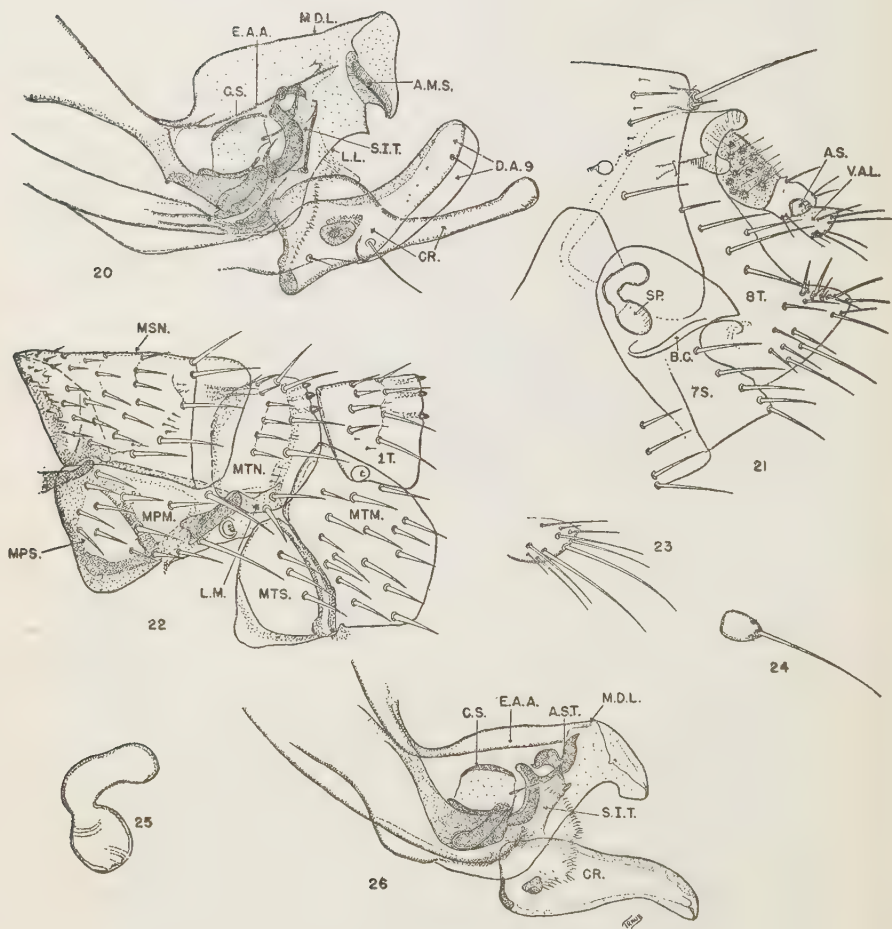
Stivalius robinsoni (Rothschild 1905)

1905. *Ceratophyllus robinsoni* Rothschild, Nov. Zool. 12:483, pl. 13, fig. 6.
 1908. *Pygiopsylla robinsoni* Rothschild, Proc. Zool. Soc. London, p. 617.
 1909. *Pygiopsylla robinsoni* Oudemans, Notes, Leiden Mus. 31:195-200, 1 fig.
 1919. *Pygiopsylla robinsoni* Rothschild, Jour. Fed. Malay St. Mus. 8:5, pl. 2, figs. 4, 5.
 1922. *Pygiopsylla robinsoni* Jordan and Rothschild, Ectoparasites 1:230, figs. 223, 224.
 1922. *Stivalius robinsoni* loc. cit. 259, 265, figs. 223, 224.
 1924. *Stivalius robinsoni* Dalla Torre, Catal.: 11.
 1938. *Stivalius robinsoni* Thompson, Teminckia 3:144.
 1946. *Stivalius robinsoni* Costa Lima and Hathaway, Monografias do Instituto Oswaldo Cruz 4:325. Rio de Janeiro, Brazil.

This species characteristically parasitizes squirrels throughout much of the Malayan Archipelago, particularly at the lower elevations. The aedeagus (fig. 4) has not been described heretofore.

Trough of aedeagal endchamber very long, extending as far cephalad as proximal third or fourth of aedeagus, where the wall of the aedeagal pouch (*P.W.*) curves to meet it. Lateral plates (*L.P.T.*) feebly sclerotized ventrally, especially in central section. Median dorsal lobe (*M.D.L.*) strongly convex near apex, there becoming cleft and curving ventrad to meet apex of the subovate short lateral lobes (*L.L.*); enclosing the characteristic apico-median sclerites (*A.M.S.*) which are beak-shaped distally. Between the bases of the apico-median sclerites is a thumb-like sclerite extending dorsad (*D.T.*). Associated with both of these structures is a ventrad-directed acuminate sclerite opposing the beak or claw of *A.M.S.* Sclerotized inner tube (*S.I.T.*) fairly straight and simple except for a dorsal spur and a pair of heavy flanking sclerites (*A.I.T.*) which are ventrally broad and straight, dorsally somewhat bluntly pointed. Crochets (*CR.*) apparently boomerang-shaped, arising from near *A.M.S.*, ventral arm subcylindrical, paralleling sclerotized inner tube. With a subdorsal thin sclerotized rod extending cephalad from near base of *A.M.S.* and apex of *A.I.T.* to a point well past the apodemal strut. Crescent sclerite (*C.S.*) well-developed. Apodemal strut somewhat of usual type, but with ventral lobe extending below level of the penis rods. With a well-developed vesicle (*V.*) at apex of aedeagal apodemal rod (*A.A.R.*). Penis rods (*P.R.*) short, thick, uncoiled, united for virtually all their length.

Records.—(All from Palawan Province, at or near sea level, unless otherwise specified): 1 ♂ *ex Sciurus*, Palawan Islands, Brook Point, Coll. D. Rabor, 2 May 1947 (R.T. #6509); 1 ♀, *ibid* but Coll. M. Celestino, 28 April (R.T. #6505); 2 ♂ ♂ *ex Tupaia*, loc. cit., Coll. D.



FIGURES 20 TO 25 THAUMAPSYLLA LONGIFORCEPS N. SP.

FIGURE 26 THAUMAPSYLLA BREVICEPS ROTHSCHILD 1907

Rabor, 26 April 1947; 1 ♂, 2 ♀ *ex Sciurus*, Palawan Island, Lapulapu, Iwahig, Coll. F. Werner, 4 March 1947 (R.T. #6507); 1 ♂ *ex Sciurus*, Culion Island, Siuk, Coll. M. Celestino, 4 April 1947 (R.T. #6499); 2 ♂ ♂, 3 ♀ ♀, *ibid* but 5 April (R.T. #6500); 2 ♂ ♂, 2 ♀ ♀, *ibid* but 7 April (R.T. #6502); 1 ♂, *ibid* but at Mohupa, Coll. H. Hoogstraal, 28 March 1947 (R.T. #6496); 1 ♂, *ibid* but 8 April (R.T. #6501); 1 ♂, 2 ♀ ♀, *ex Paradoxurus* (Palm Civet), Culion Island, San Pedro, Coll. H. Hoogstraal, 29 March 1947 (R.T. #6497); 1 ♂, 1 ♀, *ex Sciurus*, *ibid* (R.T. #6498); 1 ♀ *ex Sciurus*, Palawan Islands, Puerto Princesa, Bacungan, Coll. G. Castro, 21 March 1947 (R.T. #6511); 1 ♂, *ibid* but Coll. F. Werner, 30 March 1947; 1 ♂, 1 ♀, *ex Viverra zibetha*, Palawan Prov., Busuanga Island, Dimaniang, Coll. H. Hoogstraal, 16 and 19 March 1947 (R.T. #6493 and #6494); 1 ♂ *ex Tupaia*, *ibid* but 22 March 1947; 6 ♂ ♂, and 4 ♀ ♀, *ex Sciurus*, *ibid* but 17 March (R.T. #6492); 1 ♀ *ex Sciurus*, Cotabato Prov., Mindanao, Upi, Burungkok, elev. 1500 ft., Coll. F. Werner, 8 January 1947 (R.T. #6520).

Stivalius spiramus Jordan 1926

Advantage is taken of this paper on Philippine records to include a note from Dr. Karl Jordan (*in litt*). He states that his *Stivalius spiramus* (1926) is at most a subspecies of *Stivalius cognatus* J. & R. 1923; he was misled by the badly preserved females available at time of description.

Family Ceratophyllidae

Subfamily Ceratophyllinae

Dasyptyllus gallinulae (Dale, 1878)

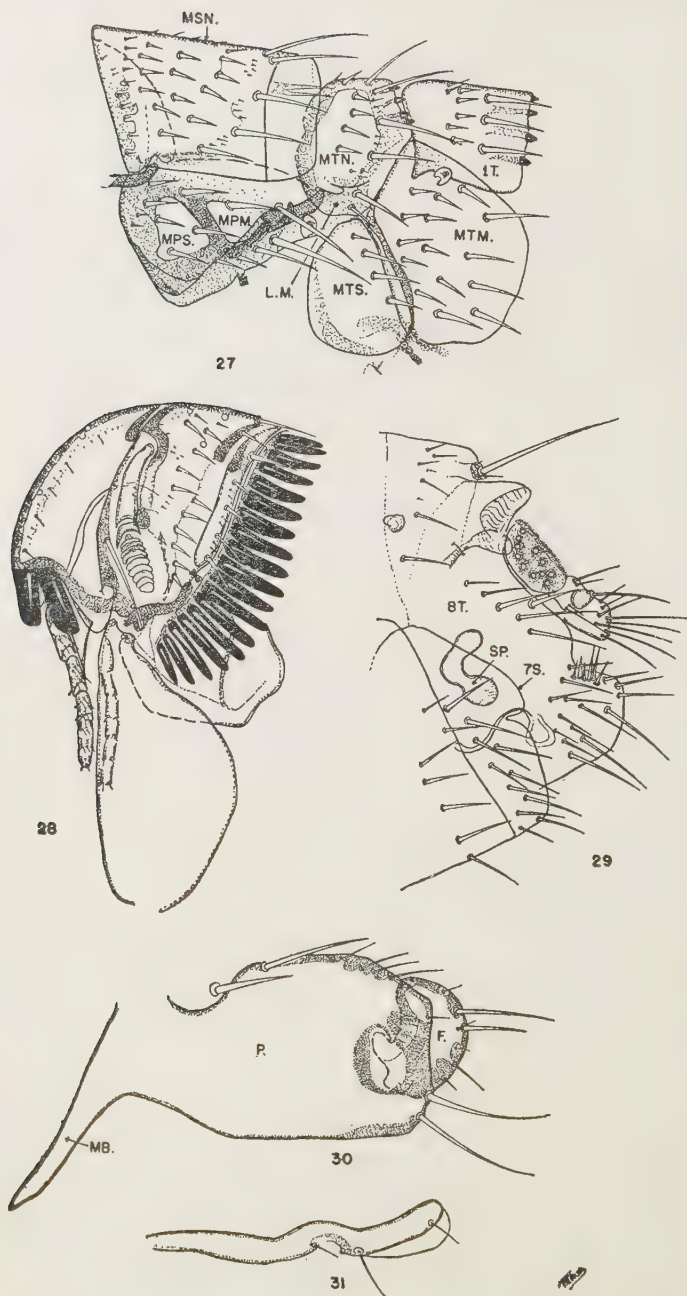
This species was supposed to be holarctic, but I have a series from Panama, which, altho showing some slight differences, is still regarded as representing the typical form (verified by Dr. Karl Jordan). The occurrence of this species in the Philippines is even more surprising. The genus occurs in the Malayan Archipelago, *D. klossi* Rothschild 1919 (female only) having been described from Sumatra. The morphological differences of the Philippines specimen probably do not validate the erection of a subspecies.

Harry Hoogstraal and Floyd Werner collected one male of this species from *Turdus poliocephalus kelleri*, a thrush, from Davao Province, Mindanao: East Slope of Mt. McKinley, elev. 7800 ft., 1 November 1946 (R.T. #6529). This bird was also host to a new genus described elsewhere (4).

Family Ischnopsyllidae

Subfamily Thaumapsyllinae

The remarkable genus *Thaumapsylla* Rothschild 1907 has been recently placed in a separate subfamily by Jordan (2). At that time, two species had been described, one African (*T. dina* Jordan 1937), and one African and Indo-Malayan (*T. breviceps* Rothschild 1907). A new species has been noted in the Chicago Natural History Museum material from the Philippines. Correspondence disclosed that this new species has been known for some time by Dr. Karl Jordan of the



THAUMAPSYLLA BREVICEPS ROTHSCHILD 1907

British Museum at Tring and by Mr. G. H. E. Hopkins, who is now also working at Tring. At their suggestion, this species is described by me at this time. I wish to thank Dr. Jordan and Mr. Hopkins for their generosity and for furnishing additional records.

***Thaumapsylla longiforceps* sp. nov.**

Diagnosis.—Close to *Thaumapsylla breviceps* Rothschild 1907 but readily separated by the following characters. Immovable process of clasper (fig. 17, *P.*) much longer, being nearly thrice as long (measured from dorsocaudal angle of manubrium) as the fifth metatarsal segment; its dorsal margin with a shallow sinus; the caudal margin rounded. In *T. breviceps*, *P.* (fig. 30) is only about twice the length of the fifth metatarsal segment; its dorsal margin is convex; its caudal margin above the acetabular bristles is virtually straight. In the new species, the exopodite *F.* (fig. 17) extends above the dorsal margin of *P.*; in *T. breviceps* the apex of *F.* is below the dorsal margin of *P.* In *T. longiforceps*, the aedeagal crochets (fig. 20, *CR.*) are cleaver-shaped with the handle pointing distad and somewhat subglobular apically; there is a sclerotized fold (*A.M.S.*) near the apex of the dorsal lobes of the aedeagus (*M.D.L.*), but no heavy sclerite at the apex of the sclerotized inner tube. In *T. breviceps* the aedeagal crochets (fig. 26, *CR.*) are of a very different shape, being smaller, narrowing only gradually, apically subacuminate and curved ventrad or caudad; *A.M.S.* is inapparent, but there is a well-developed sclerite (*A.S.T.*) by the apex of the sclerotized inner tube.

In the new species the basal abdominal sternum of the female bears two bristles, rarely one; the seventh sternum (fig. 21, *7S.*) bears about five to eight long bristles (usually five or six, rarely eight) and has a very large sinus; the lobe above the sinus somewhat acuminate. In *T. breviceps* the basal sternum is nude, while the seventh sternum (fig. 29, *7S.*) bears about eight to eleven bristles (usually eight or nine) and has a very small sinus, the dorsal lobe of which is rounded.

In *T. longiforceps*, the posterior row of postantennal bristles consists of an uninterrupted row of about 11 or 12 bristles, whereas in *T. breviceps* this row typically consists of about eight or nine bristles, a gap occurring between about the sixth and eighth bristles near/on the dorsal heavily sclerotized area. Other differences in chaetotaxy, altho somewhat variable, are pointed out in the description of *T. breviceps* which follows that of the new species.

Description.

Head (fig. 18, male).—Frontoclypeal margin evenly rounded. With a submarginal row of five short thin bristles; between each of these bristles an irregular row of three to six tiny setae. With one very long bristle inserted along middle of anterior antennal ridge. Cephalic comb consisting of two subtruncate stout spines. Genal process broad, somewhat rounded. Eye reduced to a mere vestige in lower genal angle. Maxillary lobe extending to about third segment of maxillary palpi. Labial palpi extending somewhat less than three-fourths the length of the forecoxae. Bristles of second antennal segment minute. With about three to five short stout bristles bordering dorsal ridge

above antenna; postoccipital region with three rows of bristles: the first row consisting of two or three short stout bristles, the ventral (or middle) one much the longer; the second row of three or four short stout bristles (in male, an additional clump of three to six tiny hairs beneath and between the ventral two large ones); the third row of about ten to twelve stout bristles, the lowest two or three at antennal groove shorter than the rest, the uppermost three or four inserted on a densely sclerotized area.

Thorax.—Pronotum very short, with a row of six bristles; densely sclerotized beneath the uppermost two of these; the row of bristles set off from the comb is bordered by a vertical suture with non-sclerotized margins; with two very small intercalary bristles between the larger ones. Pronotal comb remarkable for its length, extending well onto prosternum; consisting of about 17 spines on a side. Mesonotum (fig. 22, *MSN.*) with a posterior row of five long stout bristles, with two to four tiny hairs intercalated between the bases of all but the upper two of this row; with about 23 additional shorter thicker bristles irregularly arranged in three or four rows and, in addition, anterior to these 10-15 much shorter submarginal bristles or hairs. Mesonotal flange usually with two mesal pseudobristles, probably presenting vestigial spiniforms. Mesepisternum (*MPS.*) variable, frequently with six bristles arranged 3-2-1. Mesepimere (*MPM.*) with about six to eight bristles, including those on the sclerotized band between the two sclerites. Metanotum (*MTM.*) with two rows of bristles, those of posterior row about twice the length of those of first row; with three apical spinelets on each side. Lateral metanotal area (*LM.*) not set off as a distinct sclerite, its dorsal ridge not sclerotized; with two bristles. Lacking a definite pleural arch at junction of metanotal ridge and pleural ridge. Metepisternum (*MTS.*) with three bristles near posterior margin. Metepimere (*MTM.*) with 16-21 bristles, arranged somewhat as in figure.

Legs.—Procoxa heavily bristled from base to apex, but mesocoxa nude except for a few apical bristles; metacoxa nude except for some sub-apical and apical bristles. Tibiae with many of dorsolateral bristles unpaired, forming a prominent comb. Protibia and mesotibia each with a row of four or five lateral bristles; metatibia with seven or eight in this row; in each case the apical bristle is inserted near the three-fourths mark.

Measurements of tibiae and segments of tarsi (petiolate base deleted) shown in microns:

Leg	Tibia	Tarsal Segments				
		1	2	3	4	5
Pro-	165	39	47	42	36	88
Meso-	253	61	69	66	44	88
Meta-	357	132	102	72	44	88

Fifth segment of all tarsi with four pairs of lateral plantar bristles and a basal pair displaced toward midline, inserted between first lateral pair.

Abdomen.—First tergum (*1T.*) with two rows of stout bristles, those of second row much longer; with three apical spinelets on each side. Basal sternum with two (rarely one or three) lateral bristles. Sterna

two and three with about four long bristles, usually preceded by about three tiny hairs. Usually only the anterior abdominal terga have the first row of bristles developed; the second row of bristles extending ventrad of spiracle. Middle antepygidial bristle well-developed, others minute, altho ventral one slightly longer than upper.

Modified Abdominal Segments. Male.—Eighth tergum with two or three long bristles posterior to spiracle (fig. 17, *8T.*). Eighth sternum large, about twice as broad as long; caudal margin straight; with four submarginal large bristles. Immovable process of elasper (fig. 17, *P.*) very long, about two and one-half times as long as broad (measured from origin of manubrium), dorsal margin sinuate, the shallow sinus at apical two-thirds; with four or five thin marginal bristles as dorsal margin curves ventrad; caudal margin convex; ventral margin concave at junction with manubrium but soon becoming convex, then fairly straight to insertion of two stout acetabular bristles at junction with caudal margin. Exopodite (*F.*), or movable finger, longer than broad and slightly broader at apex than near base; slightly inclined cephalad; apical margin evenly convex; apical margin with five bristles, the middle one of which is longer than the first two, the fourth by far the longest, the fifth next longest, and with three additional submarginal bristles below these; with one short bristle on posterior margin. Manubrium (*MB.*) as measured from union with ventral margin of *P.*, almost half again as long as *P.* is broad; apex curving cephalad. Ninth sternum with proximal arm feebly sclerotized and indistinct. Distal arm of ninth sternum (fig. 20, *D.A.9*) long, well-developed; arched near insertion of crochet, particularly so at dorsal margin; digitoid in shape, but true ventral portion feebly sclerotized, its margin difficult to see; apex rounded; usually with but three bristles, one proximal, on ventral margin, the second submarginal and inserted near apex of ventral arch, the third bristle is subapical and borders what, at first glance, appears to be the ventral margin but in reality is a sclerotized line. With a very coiled long apodemal rod (fig. 19, *AP.R.9*) arising from angle of ninth sternum.

Aedeagal apodeme (fig. 19, *AE.A.*) about twice as long as endchamber, the limits of which are denoted by the well-developed proximal spur (*P.S.*); apodeme with a long partially coiled apical appendage (*AP.A.*). Aedeagus with a definite constriction or neck (*N.*) between proximal spur and aedeagal apodeme. Penis rods (*P.R.*) extremely long and coiled. Ventral intramural rod (*V.I.R.*) present. The endchamber dominated by the huge characteristic well articulated crochets (*CR.* and fig. 20) which are roughly cleaver-shaped, the blade broad and proximal in position and almost as long as the handle; anterior border with a ventral convexity; apex of crochet expanded, knobbed. Median dorsal lobe (*M.D.L.*) bifid at apex, its ventro-apical margins acute and associated on each side with a sclerotized ridge (*A.M.S.*) probably representing undeveloped apicomedian sclerites. With a conspicuous angulate sinus between end of lateral lobes (*L.L.*) and apex of *M.D.L.* Crescent sclerite (*C.S.*) long, well-developed; above it on each side an anterior extension of the aedeagal apodeme (*AE.A.*). Sclerotized inner tube (*S.I.T.*) relatively straight, simple, unarmored, but with the rudiments of an apical sclerite.

Modified Abdominal Segments. Female.—Seventh sternum (fig. 21, 7S.) narrow, about twice as high as long; caudal margin deeply excised at midpoint forming a large sinus, diameter of sinus greater than that of spermatheca; lobe above sinus acuminate; ventral border of sinus obtuse. Seventh sternum usually with a row of five or six long bristles, rarely with seven or eight, but in those cases the supernumerary ones smaller and/or out of line. Eighth tergum (8T.) with about one marginal and four lateral bristles well below sensillum, a patch of about six ventral or subventral ones, and in apical ventral lobe a group of about 12 marginal and submarginal bristles, some quite small. Anal stylet (A.S. and fig. 24) small and broad, less than twice as long as broad, with a long apical bristle, the ventral and dorsal bristles represented by minute vestiges. Dorsal anal lobe with about three dorso-marginal bristles, one of these proximal, two apical; with two bristles at ventrocaudal angle. Ventral anal lobe (V.A.L. and fig. 23) relatively lightly sclerotized and with a total of about four bristles at lower angle, and about six near upper angle, including two very long stout marginal or submarginal bristles which are the most median of each group. Spermatheca (SP. and fig. 25) with a subglobular head and a tail which is longer than the head, upturned and apically dilated. Bursa copulatrix (B.C.) gently sinuate.

Types.—Holotype male and allotype female *ex Rousettus*, Mindanao, Davao City, Sitio Tegato, Luangbay Cave, 22 October 1946, Coll. H. Hoogstraal. Deposited in Chicago Natural History Museum. *Paratypes.*—4 ♂♂, 2 ♀♀ with same data (R.T. #6521) as holotype; 13 ♂♂, 9 ♀♀ *ex* "bat," Davao Province, Davao Gulf, Samal Is., Tawang, Bat Cave, sea level, Coll. H. Hoogstraal, 2 December 1946 (R.T. #6530); 1 ♀ *ex Eonycteris robusta*, Cotabato Province, Mindanao, Cotabato City, Central Cave, sea level, Coll. F. Werner 1947, (R.T. #6518). Paratypes deposited in U. S. National Museum, British Museum, Rocky Mountain Laboratory of U. S. Public Health Service, Canada Dept. of Agriculture, the author's collection and elsewhere.

Remarks.—It is interesting to note that Mr. Hoogstraal collected this species and *T. breviceps* simultaneously from the same set of bats (R.T. #6530).

The British Museum has records of this species from the Philippines, Java, and Borneo.

Thaumapsylla breviceps Rothschild 1907

The distinguishing characteristics of the species have been given in the diagnosis of *Thaumapsylla longiforceps*. The following description lists only other differences, but it should be noted that the chaetotaxy is somewhat variable in both species.

The gap in the postantennal row of bristles (fig. 28) is equal to about one-third to one-half of the length of the row. The mesonotum (fig. 27) bears a total of about 22-24 bristles, ignoring the tiny submarginal ones. Usually with four apical spinelets on each side of metanotum and first tergum. The most apical of the lateral bristles of the protibia proximad of midpoint or at level of midpoint.

Immovable process of clasper (fig. 30, P.) definitely less than twice as long as broad; dorsal margin with four thin bristles near height of

convexity; caudal margin straight or slightly concave above acetabular bristles. Exopodite (*F.*) without submarginal dorsal bristles. Male ninth sternum with distal arm long and narrow, the sclerotized portion distad of the arch more than thrice as long as broad (fig. 31). Aedeagus (fig. 26) with a twisted curved fusiform sclerite (*A.S.T.*) dorsad of apex of sclerotized inner tube. Lacking sclerotizations characteristics of or suggesting *A.M.S.* Apicoventral border of median dorsal lobe straight. Crochet (*CR*) at midpoint more than two-thirds as broad as base, slightly constricted here; apex slightly pointed, inclined downwards.

Female seventh sternum (fig. 29, *7S.*) with sinus definitely less in diameter than head of spermatheca; with seven to eleven (usually eight or nine) bristles, two of these usually ventromarginal. Bursa copulatrix somewhat S-shaped.

Records.—2♂♂, 4♀♀ *ex Rousettus*, Mindanao, Davao City, Sitio Tegato, Luangbay Cave, sea level, Coll. H. Hoogstraal, 22 October 1946 (R.T. #6521); 3♂♂, 5♀♀ *ex* "bat," Davao Province, Davao Gulf, Samal Is., Tawang Cave, sea level, Coll. H. Hoogstraal.

In the British Museum are specimens from South Africa, Ceylon, Java, Malaya, Siam, and the Philippines.

Pulex irritans Linnaeus

This species is probably abundant throughout much of the Philippines, especially at lower elevations.

Records.—28♂♂, 14♀♀ *ex* domestic dog. Cotabato Province, Mindanao: Parang, Bugasan, sea level, Coll. F. Werner, 2 December 1946 (R.T. #6519); 4♂♂, 3♀♀ *ex Mydans*, Palawan Province, Palawan Island, Brook Point, sea level, Coll. D. Rabor, 29 April 1947 (R.T. #6506).

Ctenocephalides felis orientis Jordan 1925

As is expected, this form was collected from a variety of hosts and locations.

Records.—1♂ *ex Sciurus*, Palawan Province, Busuanga Island, Dimaniang, near sea level, Coll. H. Hoogstraal, 17 March 1947 (R.T. #6492); 1♂, 1♀ *ex Paradoxurus* (Palm Civet), Palawan Province, Culion Island: San Pedro, Coll. H. Hoogstraal, 29 March 1947 (R.T. #6497); 1♂, 2♀♀ *ex Paradoxurus*, Palawan Island, Puerta Princesa, sea level, Coll. H. Hoogstraal, 21 April 1947 (R.T. #6519); 1♀ *ibid* but 22 April (R.T. #6515); 4♀♀ *ibid* but from domestic cat, 20 April (R.T. #6513); 1♀ *ibid* but *ex Mydans* (Badger Skunk), 29 April (R.T. #6516); 1♀ *ex Lutra cinerea*, *ibid*, 25 May 1947 (R.T. #6515); 1♀ *ex Mydans*, Palawan Island, Brook Point, Coll. D. Rabor, 29 April 1947, (R.T. #6506); 4♂♂, 1♀ *ex Felis bengalensis minuta*, loc. cit., Coll. M. Celestino, 10 May 1947 (R.T. #6510).

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3. Traub, R. 1950. *Sigmactenus*, a new genus of flea from the Philippines (Siphonaptera). Jour. Wash. Acad. Sci. 40(11):371-378, figs. 1-14.
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LIST OF ABBREVIATIONS

A.A.R.—aedeagal apodemal rod	MPS.—mesepisternum
A.B.—antepygial bristle	MSN.—mesonotum
AE.A.—aedeagal apodeme	MTM.—metepimere
A.I.T.—armature of inner tube of aedeagus	MTN.—metanotum
A.M.S.—apical or apico-median sclerite of aedeagus	MTS.—metepisternum
AP.A.—apical appendage of aedeagal apodeme	MX.—maxillary lobe
AP.R.9—apodemal rod of ninth sternum	N.—neck or constriction of aedeagus
A.S.—anal stylet	P.—immovable process of clasper
A.S.T.—apical sclerite of inner tube of aedeagus	P.A.9—proximal arm of 9th sternum
B.C.—bursa copulatrix	P.L.A.—pleural arch of metathorax
CR.—crochet of aedeagus	P.R.—penis rods
C.S.—crescent sclerite	P.S.—proximal spur of aedeagus
D.A.9—distal arm of 9th sternum	P.W.—wall of aedeagal pouch
D.T.—dorsal thumblike sclerite of aedeagus	R.—dorsal ridge of lateral metanotal area
E.A.A.—extension of aedeagal apodeme	S.I.T.—sclerotized inner tube
F.—exopodite or movable finger	SN.—sensillum
L.L.—lateral lobes of aedeagus	SP.—spermatheca
L.M.—lateral metanotal area	T.A.P.9—tergal apodeme of 9th tergum
L.P.—labial palpi	TR.—trochanter
L.P.T.—lateral plates of aedeagal apodeme	V.—vesicle
MB.—manubrium	V.A.L.—ventral anal lobe of proctiger
M.D.L.—median dorsal lobe	VC.3A.—accessory link below third vinculum
MI.P.—middle plate of aedeagal apodeme	V.I.R.—ventral intramural rod
MPM.—mesepimere	V.R.—ventral ridge of lateral metanotal area
	1T.—first tergum
	8T.—eighth tergum
	7S.—seventh sternum
	8S.—eighth sternum

[Explanation of Plates I-VII]

Plate I

- Fig. 1. *Stivalius pomerantzi* Head, male.
 Fig. 2. *Stivalius robinsoni* (Rothschild 1905). Spermatheca.
 Fig. 3. *Stivalius pomerantzi* Aedeagus.
 Fig. 4. *Stivalius robinsoni* (Rothschild 1905). Aedeagus.

Plate II

- Fig. 5. *Stivalius pomerantzi*. Modified abdominal segments. Male.
 Fig. 6. Ibid. Metatibia.
 Fig. 7. Ibid. Metathorax.

Plate III

- Fig. 8. *Stivalius pomerantzi*. Clasper and exopodite.
 Fig. 9. Ibid. Distal arm of ninth sternum.
 Fig. 10. Ibid. Male eighth sternum.
 Fig. 11. *Stivalius ralius*. Ventral anal lobe.

Plate IV

- Fig. 12. *Stivalius ralius*. Head, female.
 Fig. 13. Ibid. Thorax.

Fig. 14. Ibid. Anal Stylet.

Fig. 15. Ibid. Spermatheca.

Fig. 16. Ibid. Modified abdominal segments. Female.

Plate V

Fig. 17. *Thaumapsylla longiforceps*. Clasper and exopodite.

Fig. 18. Ibid. Head, male.

Fig. 19. Ibid. Aedeagus.

Plate VI

Fig. 20. *Thaumapsylla longiforceps*. Distal portion of aedeagus.

Fig. 21. Ibid. Modified abdominal segments, female.

Fig. 22. Ibid. Thorax, male.

Fig. 23. Ibid. Ventral anal lobe, female.

Fig. 24. Ibid. Anal stylet.

Fig. 25. Ibid. Spermatheca.

Fig. 26. *Thaumapsylla breviceps* Rothschild 1907. Distal portion of aedeagus.

Plate VII

Fig. 27. *Thaumapsylla breviceps*. Thorax, male.

Fig. 28. Ibid. Head, male.

Fig. 29. Ibid. Modified abdominal segments, female.

Fig. 30. Ibid. Clasper and exopodite.

Fig. 31. Ibid. Distal arm of ninth sternum.

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OCCURRENCE AND IDENTIFICATION OF THE PRAIRIE
DEER-MOUSE IN CENTRAL MARYLAND

BY WILLIAM H. STICKEL, *Biologist*
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One of the interesting mammalogical phenomena of recent years has been the discovery of *Peromyscus maniculatus bairdii* at progressively more eastern localities. Osgood (1909) knew this form from no farther east than central Ohio, but by 1942 its distribution in Ohio was reported as statewide (Bole and Moulthrop, 1942). It was reported from the northern panhandle of West Virginia and from northeastern Tennessee by Kellogg (1937, 1939). Mitchell (1934) first recorded it from northwestern Pennsylvania. Richmond and Rosland (1949) and Grimm and Roberts (1950) found it in all counties of Western Pennsylvania and believed it was spreading eastward via roadsides and cultivated fields. The first record for New York was that of Moulthrop (1938), who trapped *bairdii* in Genesee County, in the western part of the state.

More recently, Hamilton (1950) recorded the appearance of *bairdii* in 1947 at Ithaca, New York, an area that has been heavily trapped for 20 years. Hamilton also mentioned the capture of prairie deer-mice at North Harrisburg, Dauphin County, Pennsylvania—the first record of *bairdii* east of the Appalachian Mountains.

The prairie deer-mouse¹ was unknown in Maryland until 1949, when Lucille F. Stickel and Oscar Warbach live-trapped several in crop fields at the Patuxent Research Refuge, Prince Georges County. These fields are about 1.9 miles north of the village of Bowie. They are situated on a wide bench of sandy clay near the Patuxent River, on the upper part of the Atlantic Coastal Plain.

Between May 29 and August 14, 1949, two sexually mature males and three gravid females were brought to the laboratory and caged. The 14 young produced by these females from matings in the wild were reared until about March 1, 1950, when all 19 animals were prepared as skins and skeletons. The litters were then six months two weeks, six months three weeks, and eight months three weeks of age.

The 5 adults and 14 young were compared with many specimens of *bairdii* in the Biological Surveys collection from various localities in the Middle West. No cranial, mensural, or color differences were ob-

¹Common names used follow the excellent suggestions of Dice (1937).

served. Indeed, the Patuxent specimens could not have been picked out if mixed with certain Middle Western series.

After the first *bairdii* was tentatively identified, all *Peromyscus* (except the five brought to the laboratory) were carefully examined, measured in the field, ear-tagged, and released where caught. Recaptures often permitted more certain identification. Field identifications were checked by comparing measurements with those of known specimens, with the age of the individual in question being considered. Doubt remained about very few released animals.

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The prairie deer-mouse seems to be precariously established at the Refuge. In the year from May 1949 to June 1950, 23 *bairdii* were captured by Mrs. Stiegel and Mr. Warbach in connection with population and farm wildlife studies. Fourteen were females and nine were males. Only six were considered juveniles. Deer-mice were at no time common in the fields and did not appear to increase in number. They were far outnumbered by feral house-mice (*Mus musculus*) occupying the same habitat.

Deer-mice were most often caught in corn and in young wheat, both relatively open habitats. Here several individuals had good recapture histories and are known to have bred. Deer-mice were trapped only occasionally in hay or tall wheat. This is in accord with the well known preference of *bairdii* for open, rather exposed sites. Released individuals were often followed to burrows in nearly bare fields.

We do not know if *bairdii* has spread to any uncultivated habitats of the Refuge, but few if any seem suitable for this mouse. It has been found in but one set of adjoining fields, and is not known to have reached the other farm on the Refuge.

P. m. bairdii may not be securely established in this locality, but it definitely is reproducing. All but one of the females were in some stage of breeding whenever caught. Evidence from dates of appearance of very small juveniles, and from the condition of frequently retrapped females, indicates that litters were born in early April, May 1, September 11, and early November. The three caged females bore their litters June 15, August 7, and August 17. Their litters consisted of 6 (one died), 5, and 4 young. Nine of the survivors were males, five females.

It would be interesting to know when and how the local *bairdii* population arrived. Although the species was not found here before 1949, it could have occurred in its present small numbers without being noticed, for there was little trapping in crop fields, and an occasional *bairdii* could have passed for a young *noveboracensis*. It is equally difficult to say how this deer-mouse got here. No doubt the animal is expanding its range by natural means in consequence of artificially created habitats, but the possibility of accidental transportation is considerable. The wide dispersal of the house-mouse is an excellent example. Mice can easily be carried with grain, plants, or other items. We know of instances of mice living in passenger cars for long periods, and they should live equally well in freight shipments. It may be significant that the fields in which *bairdii* has been found on the Refuge are near two equipment barns, a paved road, and a private farm.

SEPARATION FROM *PEROMYSCUS LEUCOPUS*
NOVEBORACENSIS

Now that the enviable situation of having but one type of *Peromyscus* no longer exists in this part of the East, local biologists are faced with the necessity of being able to separate *P. m. bairdii* and *P. l. noveboracensis*—not only in the laboratory, but, insofar as possible, in the field. A comparative study of prepared local specimens was made as a basis for both laboratory and field identifications. It was soon found, however, that field measurements of living mice, made by Lucille F. Stickel, differed slightly from those of freshly killed specimens although the same methods of measuring were used. The differences presumably reflect not only individual variation of the specimens, but also the difficulty of getting identical measurements of living and dead mice. The field measurements are therefore considered separately. They may prove more useful to workers doing live-trapping than will the other data, particularly since they include measurements of juveniles. Only specimens from the Patuxent Refuge were used in either set of data. It is not anticipated that the results will hold for other regions, or for every specimen from this region.

Young *bairdii* and fully adult *noveboracensis* are generally recognized as such. The difficulty lies in distinguishing juvenile or subadult wood-mice from subadult and adult prairie deer-mice. A few of our specimens suggest that the greatest trouble comes from fall-born *noveboracensis* that fail to attain the usual size during the winter although they are of adult or subadult age and pelage. One individual of this sort began growing again in the spring. It is extremely easy to misidentify such individuals in the flesh. Before attempting identification of questionable specimens, it is desirable to determine age as well as feasible by such indicators as pelage, known history of live-trapped animals, or in the laboratory by tooth wear or ankylosis of epiphyses.

Measurements of total length, tail, and hind foot were made by standard methods. The ear (from notch) was measured in its natural position, neither stretched nor straightened. Cranial measurements were made with vernier calipers. Condylar-incisive length was measured from the front of an upper incisor to the rear of the occipital condyle of the same side. Cranial breadth was measured at the lower ends of the lateral lobes of the parietals, with jaws of calipers held longitudinally along the skull. Length of maxillary tooth row is crown length.

The figure compares variation of freshly killed specimens of both forms in some of the more diagnostic measurements. Length of hind foot is probably the most useful measurement, not only because of its diagnostic value, but also because adult length is attained relatively early in life. The series shown on the graph do not overlap in length of foot, but overlapping certainly would occur in larger series. The following tabulation of field measurements of living mice supplements the graph. Overlapping at 19 mm. will be noted. Four subadult to adult mice of each form had feet of this length.

	Gray Juveniles			Subadults to Adults		
	No.	Range	Av.	No.	Range	Av.
<i>P. m. bairdii</i>	7	16-18	17.1	14	17-19	18.0
<i>P. l. noveboracensis</i>	12	19-20	19.6	27	19-22	20.2

Ear length is a useful character despite overlapping curves of variation. Measurements taken from skin labels, however, must be used with discretion: some of the greater *noveboracensis* ear lengths plotted in the figure were measured by preparators other than the writer and may have been made with ear pulled straight. Measurements of ears of living mice apparently run one or two millimeters lower than those of freshly killed mice. Our field measurements are thus lower than those of figure 1, but seem equally diagnostic:

	Juveniles and Subadults			Young Adults and Adults		
	No.	Range	Av.	No.	Range	Av.
<i>P. m. bairdii</i>	8	10-12	11.4	9	10-14	12.0
<i>P. l. noveboracensis</i>	18	12-16	14.2	18	14-16	14.7

An ear length of 14 mm. was by far the commonest length among living *noveboracensis* of all age groups, but appeared in only two living *bairdii*, one young adult, one adult.

Tail lengths of the two forms also overlap, but the measurement is frequently of value, especially if the approximate age of the individual is known. Part of the overlapping is caused by the increase of tail length until full growth of the individual is reached. Another part of the overlapping is independent of age. For example, the upper limit for adult *bairdii* and the lower limit for adult *noveboracensis* occasionally overlap at about 65 mm., to judge from both field and laboratory data.

Field measurements of gray juveniles of different sizes show tail lengths of 40 to 53 mm. for seven *bairdii*, and lengths of 54 to 76 mm. for twelve *noveboracensis*. The other field measurements are similar to those of the graph, except for a young adult *bairdii* with a tail of 50 mm. and a subadult *noveboracensis* with a tail of 60 mm.

Total length is of little use in the present connection, as it is of diagnostic value only for large or small individuals about which there is seldom any real question.

Cranial breadth reflects the greater size of the brain case in *noveboracensis* better than does cranial depth. The difference between these two mice in size of brain case is often obvious in direct comparison, and is apparent early in life.

Condyle-incisive length of skull is chiefly a function of the greater size of *noveboracensis*. It is of diagnostic value in the present series except for a few young *noveboracensis*.

Length of maxillary tooth row will nearly separate the two series. It is free of age variation once all teeth are erupted, except that individuals with much worn teeth may have a slightly shorter crown length than younger individuals. Length of tooth row is of particular interest because it should make possible accurate determination of the remains of many individuals in predator stomach and scat material.

Shape of the incisive foramina is one of the best characters. These foramina are anteriorly constricted in *noveboracensis*, open and evenly curved anteriorly in *bairdii*. This is true of all our *bairdii*. One of our *noveboracensis* has the *bairdii* condition, and another is intermediate in this respect. This character also should be of value in dealing with food habits materials.

The greater hairiness and sharper bicoloration of the tail of *bairdii* are relative characters of secondary importance. They cannot be wholly relied upon, but are of use in combination with other characters. Young *noveboracensis* may have short, bicolor tails that are as hairy as those of many *bairdii*.

Coloration is of very little value. When our series are compared, *bairdii* averages grayer, duller, and less yellowish on the sides, but some individuals are as bright as many *noveboracensis*. Few specimens other than old red wood-mice could be properly determined by color alone if the series were mixed. Minor color characters, such as white ear tufts, dorsal stripe, rufous rump, color of snout, and others that have been mentioned by various workers, seem more misleading than helpful.

Shape of head of living individuals (see Burt, 1946, p. 204, fig. 94) is of use to workers thoroughly familiar with the animals in life, but impresses us as very difficult to use accurately.

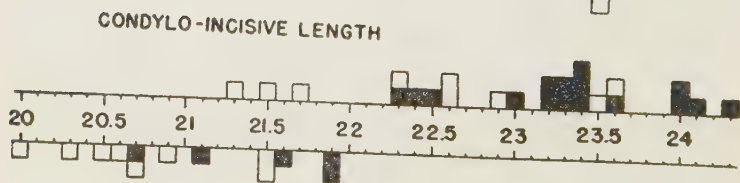
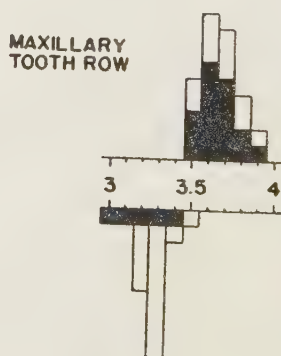
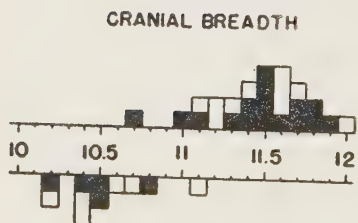
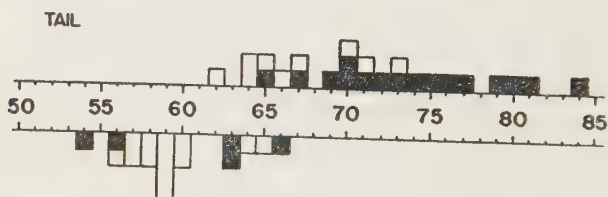
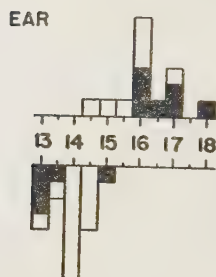
Our approach to identifying these mice in the field is to ascertain the age of each individual as well as possible, and to take measurements of hind foot, ear, and tail. Hairiness and bicoloration of tail and shape of head are also considered. Measurements of questionable individuals are compared with tabulations of field measurements of representative age series of local mice of each form. Frequently some one measurement will conclusively decide an otherwise difficult identification. The tail or the ear may be too long for a juvenile to be *bairdii*, or the foot may be too short for a subadult to be *noveboracensis*. We believe that a degree of accuracy adequate for most field problems can be attained rather quickly in this way. Repeated captures of troublesome individuals may also be highly informative: mice tentatively listed as *bairdii* have grown up to be easily identified *noveboracensis*. Habitat is not relied on in making identifications, for we have often found wood-mice well out into fields.

It is to be expected that some identifications will be probable rather than positive, and that certain individuals cannot be determined in the field at all. This will be especially true, of course, in parts of the country where many specimens cannot be identified satisfactorily even in the laboratory.

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Explanation of Plate.

Measurements of *Peromyscus leucopus noveboracensis* and *Peromyscus maniculatus bairdii* from the Patuxent Research Refuge, Maryland. Data for *P. l. noveboracensis* are above the numbers, *P. m. bairdii* below. One square = one individual. Black blocks represent adults (*noveboracensis* with moderate to much tooth wear; *bairdii* of breeding age when trapped, and then kept alive for several months before preparation). Unshaded blocks represent young (*noveboracensis* with little or no tooth wear; *bairdii* born in laboratory and reared to ages stated in text). No gray juveniles are included. All measurements are in millimeters.

PROCEEDINGS
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TWO NEW GENERA AND A NEW FAMILY OF
TROPICAL AMERICAN FROGS

BY EDWARD H. TAYLOR

A group of Central American frogs, at the present time placed in the genera *Centrolene* and *Centrolenella*, have for some time been of considerable interest to me, and I proposed this year to examine the material in the various American museums with a view of revising the group. At the present time specimens of these genera in certain museums are not available so I am delaying my attempt to review the entire group until such time as the material may become available. At this time I propose two new genera for species already established, and propose a family status for these small frogs.

The genus *Centrolene* was established in 1872 by Jimenez de la Espada for *C. geckoideum* from the Río Napa, Ecuador. This species is characterized chiefly by the presence of a process or hook growing out from the humerus in the males, and the presence of vomerine teeth. In females there may be some evidence of this humeral modification if the arm is somewhat dessicated, but I believe it is not otherwise visible externally. While the teeth are normally present they may be sometimes absent. The length of this species far exceeds any other belonging to this group of genera. While the length of the type is not given, a specimen examined has a length of 57mm.

A species of small frogs from near Limón on the Caribbean side of Costa Rica was described by Boettger as *Hyla prosoblepon*. This was later referred to the genus *Centrolene* by G. K. Noble.¹ It agreed in general with the characteristics of that genus. A distinct humeral hook was present in males of the genus (absent in females) and vomerine teeth were likewise present.² It differed very greatly in size and general appearance. Since the skeletal structure of *C. geckoideum* has not been studied it is not impossible that when the anatomy of these forms is better known they may be separated generically by other characters.

Certain other species may also belong with *Centrolene prosoblepon*. Noble (*loc. cit.*) has suggested that *Hyla ocellifera* Boulenger³ from northwest Ecuador is a member of the group but did not specifically place

¹Amer. Mus. Nat. Hist. Bull., vol. 42, 1920, p. 442; and Proc. Biol. Soc. Washington, vol. 37, 1924, pp. 66-67.

²The teeth are absent in a specimen taken with several others on the eastern slope of Volcán Poás, Costa Rica. In 22 specimens I have examined from an elevation of from 4000 to 5500 ft. elevation in Costa Rica, the teeth were present in all but one. Noble has mentioned that the teeth on the vomers may be absent, but this may be regarded as an infrequent exception. Similar loss of teeth is known to occur in certain species of *Hyla* and *Syrhophus* in Mexico. In very young specimens of many frogs the teeth may be absent because they have not yet erupted.

³Ann. Mag. Nat. Hist., ser. 7, vol. 3, Apr. 1899, p. 277, pl. 12, fig. 4.

it in a genus. In this species the vomerine teeth are present but no mention is made of the humeral characteristics. I suspect that the type is a female (no mention being made of the vocal sac or vocal slits) in which case the hook would normally be absent. Proper placing of this form awaits further data on males.

Noble (*loc. cit.*) proposed the genus *Centrolenella* for a species of this group which he described under the name of *Centrolenella antioquiensis*, from a locality 14 mi. N. of Mesopotamia, Dept. Antioquia, Columbia. He had available one adult female, and two males of which one was adult. He states, "closely related to *Centrolene* from which it differs in the absence of vomerine teeth and humeral spines." Most of the other generic characteristics mentioned are likewise characteristic of *Centrolene*.

An examination by me in 1949 of the type and paratype specimens of *C. antioquiensis* seems to throw a different light on the matter. The adult paratype (so labeled) has well-developed humeral hooks and is presumed to be the adult specimen mentioned by Noble along with the type description. While the absence of this character is mentioned in the generic diagnosis, no further comment is made regarding the presence or absence of the hook, in the specific description. There was no evidence that any substitution of specimens had taken place. I returned to the American Museum in the summer of 1950 to continue my study of the group but the paratypes of the species could not be located at the time of my visit.

Inasmuch as the most salient generic character given for the genus *Centrolenella* as separating it from *Centrolene* is actually present in the male of the type species (the presence of the humeral hook in the males), and the remaining character of the vomerine teeth is somewhat variable, I shall regard *Centrolenella* a synonym of *Centrolene*.

This action leaves the numerous species that have been described under the genus, or later referred to it, without a generic name. Honoring Dr. Doris Cochran of the United States National Museum, I propose for these the name,

Cochranella gen. nov.

Genotype. *Centrolenella granulosa* Taylor.

This genus is characterized by the absence of the humeral hook or process in both sexes, absence (generally) of the vomerine teeth, without a free tip or sharp protruding spine on the pollical rudiment; toes webbed, with usually some webbing on the hand; terminal digital discs either transversely oval or subtriangular; a rather large palmar tubercle; no omosternum; a small cartilaginous sternum; pupil horizontal; ostia pharyngia present; the tympanum exposed or absent; a broad thin anal flap; pigment appearing in recently preserved animals, lavender to purple and confined to head and dorsal surfaces; vocal slits in males; astragalus and calcaneum fused into a single element.

Forms belonging or presumably belonging to this genus are:

- Cochranello eurygnatha* (Lütz)
- Cochranella fleischmanni* (Boettger)
- Cochranella colymbiphyllum* (Taylor)
- Cochranella granulosa* (Taylor)

- Cochranella pulverata* (Peters)
- Cochranella uranoscopa* (Müller)
- Cochranella viridissima* (Taylor)
- Cochranella valerioi* (Dunn)
- Cochranella albomaculata* (Taylor)
- ? *Cochranella buckleyi* (Boulenger)
- ? *Cochranella parambae* (Boulenger)
- Cochranella chrysops* (Cope)
- Cochranella parvula* (Boulenger)

A species of small frog related to the preceding genera differs markedly in having a large pollical remnant with a free tip, and bearing a sharp protruding spine in the male. It appears to stand in relation to *Cochranella*, as *Plectrohyla* does to *Hyla*. I propose for it the generic name

Teratohyla gen. nov.

Genotype: *Centrolenella spinosa* Taylor.

Characterized by the presence of a considerable pollical remnant with a free tip, and bearing a protruding spine in the adult males (present in females but less developed, the spine being entirely concealed). Vomerine teeth absent. Other characters as in *Cochranella*.

The species, *Teratohyla spinosa* occurs in the lowlands of Costa Rica and Panamá Canal Zone. In the latter locality it has been mistaken for another species. The status of *Hylella parambae* Boulenger (*parabambae*) is in question. It is not impossible that it may prove to represent a second species of this genus.

The group of frogs considered under the preceding genera has long been puzzling to herpetologists. Noble in his discussion (*loc. cit.*) has pointed out the isolated position that it holds. He thought that certain of the characters pointed to the family Leptodactylidae (which he later united with the Bufonidae) and certain of the characters pointed to the Hylidae. However he maintained them with the former group. Boulenger has associated species that he knew, with the Hylidae. Nieden in his *Das Tierreich*, Anura I, has regarded them as hylids. Smith and Taylor in their Mexican Catalogue placed them in the Hylidae without adequate investigation.

What I now regard as one of the most significant characters in this group of frogs, (and for that matter in the whole order), is one that previous workers have seemingly overlooked. This is the complete fusion of the bones in the third (tarsal) joint of the limb. This fusion is such that there is little superficial evidence that two bones are involved.

In 1941 I revived Cope's family name, Pelodytidae, for the living frogs known to have a fusion of the tarsal elements, having an arciferal pectoral girdle, procoelous vertebrae, a bony style in the sternum, the coccyx articulating by a double condyle, lacking the terminal processes on the ultimate phalanges of the digits, and the intercalated cartilages. Since the frogs here under consideration differ in all these characters from the Pelodytidae save in the condition of the astragalus and calcaneum, coccyx and vertebrae, I am proposing to give the group a family status, the name for which will then be

Centrolenidae, family novum.

The characteristics are: arciferal pectoral girdle; omosternum absent; sternum small cartilaginous; nine procoelous vertebrae; sacral diapophyses distinctly dilated; most terminal phalanges T-shaped; all digits with an intercalated cartilage between penultimate and ultimate phalanges; femur with a thin ridge near the acetabular articulation; coccyx articulating by a double condyle; digital formula of hand, 1,2,2,3,3; of foot 2,2,2,4,3.

These small frogs are secretive and are difficult to capture unless one finds them breeding. In consequence except for a very few species they are rare in collections. Since the territory comprising Costa Rica and Panamá has some ten described species representing three genera, one may anticipate that when the fauna of South America becomes well explored a large series of species with perhaps still other genera will be made known. I am aware of at least a dozen undescribed forms already in American museums masquerading under incorrect names.

Furthermore I regard it as strongly probable that certain African frogs, especially those now recognized in the subfamily Heleophryninae belong in the family Centrolenidae. Workers having available material of this group would do well to examine the condition of the limbs and to compare other structures with this family.

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A NEW RACE OF THE HAWK-OWL, *Ninox scutulata*,
FROM THE PHILIPPINES

BY H. G. DEIGNAN*

The hawk-owl, *Ninox scutulata*, has hitherto been considered a mere winter visitor to the Philippine Islands, but study of specimens in the collections of the United States National Museum, the American Museum of Natural History, the Chicago Natural History Museum, the Museum of Comparative Zoölogy, and the Peabody Museum of Natural History at Yale University (to the authorities of all of which my thanks are hereby given), has shown that a very distinct race is resident at least in the southern portions of the Archipelago. The new form may be called

Ninox scutulata randi, subsp. nov.

Type.—U. S. National Museum No. 200,878, adult female, collected at Catagán (elev. 1,100 ft.), at the base of Mount Malindang, Misamis Province, Mindanao Island, on May 23, 1906, by Edgar A. Mearns (original number 14,196).

Diagnosis.—Nearest *Ninox sc. japonica* (Japanese Islands) in the dark reddish chocolate of its upper parts (with the pileum scarcely differentiated from the mantle), the rufescent-tinged bands on the rectrices, and the preponderance of chestnut over white on the under parts, but everywhere even darker and redder than *japonica*, and easily distinguished from this and all other known races by its much more robust bill and much larger toes and claws.

Remarks.—Specimens of *N. sc. randi* have been seen from the following localities: Mindoro, 1 unsexed, July 3; Cebú, 1 male, June 18; Mindanao, 2 females, May 23, June 17; Basilan, 2 males, April 10, no date.

Although I am in agreement with those recent authors who have allocated Raffles's name *scutulata* to the race resident in Sumatra and Malaya, I do not stand with them in considering the name *japonica* applicable to populations of Korea and China, which differ from true *japonica* in their rather paler upper parts, more gray-brown (less rufescent) tail bands, and the greater proportion of white to chestnut on the under parts. It is probable that Chinese birds must be called *Ninox scutulata florensis* (Wallace), from *Athene florensis* Wallace (Proc. Zool. Soc. London, for 1863, pt. 3, Feb. 1864, p. 488: Flores).

A form of the species is resident on some of the small islands between Formosa and Luzón. If distinct from *florensis*, they must perhaps be called *Ninox scutulata togo* Momiyama (Amoeba, vol. 3, Nos. 1-2, p.

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68: Botel Tobago), but I have been unable to separate them satisfactorily from Chinese birds, which appear in winter on the same islands, as well as on the islands farther to the south.

The new race is named for Austin Loomis Rand, of the Chicago Natural History Museum, who has courteously turned over to me unstudied material from the Philippine collections in his charge.

PROCEEDINGS
OF THE
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TWO NEW SPECIES OF LACHNINI (APHIDIDAE)
FROM ARIZONA

F. C. HOTTES AND L. P. WEHRLE

Herewith we describe two new species of Aphididae from Arizona.

Schizolachnus tusoca new species

Alate viviparous female.

Size and general color.—Length from vertex to tip of anal plate 2.35mm. Data on color not available. Head dusky brown with anterior margin considerably darker. Prothorax concolorous with head. Meso and metathorax dark brown. Abdomen in life perhaps pale green or very light dusky, with cornicles, small areas around the spiracles, cauda and anal plate light dusky. Antennal segment I and II slightly lighter in color than the head, segments III and IV pale dusky with distal portions darker, segment V and VI slightly darker than segments III and IV with distal portions darkest. Femora, with exception of extreme base dark brown. Pro and metathoracic tibiae dark dusky brown almost uniform in color throughout. Mesothoracic tibiae light dusky with distal portions darker. Tarsi dusky brown.

Head and thorax.—Head with median longitudinal suture present but indistinct. Comparative lengths of antennal segments as follows: III .443mm., IV .171mm., V .171mm., VI .114 + .028mm. Secondary sensoria confined to third antennal segment numbering four to five, arranged in a straight row, small, and hardly tuberculate. Segment III smooth except for apical portion, remaining segments lightly imbricated. Antennal hair sparse for genus, somewhat inclined. Majority of hair on III distinctly less than two times width of segment in length. Rostrum short, reaching less than half-way to mesothoracic coxae. Hair on anterior margin of head suggestive of that on dorsum not longer than that on antennae. Hair on prothorax shorter and somewhat thicker than that on remainder of thorax. Stigma light dusky with a pronounced scale-like surface. Media once branched. Surface of wing very rough, with the scale-like structures for the most part sharp pointed and when seen from the side suggestive of hair. Pro and mesothoracic femora provided with fine hair which is shorter than the width of the segment. The hair on the metathoracic femora is most unusual. That on the inner margin being very short and dull pointed, almost peg like and equal to about one-third of the width of the segment in length. The hair on the outer margin of the femora is fine and about half the width of the segment in length.

Hind tibiae 2.28 mm. in length, provided with thick spine-like hair which is rather dull pointed. The hair on the inner margin is shorter than that on the outer margin. The hair at the apex of the tibiae is

longer than that which is more proximal. Metathoracic tarsi .40mm. long. The first tarsal segment is provided with a few hair, perhaps ten to twelve, these are all of one kind and all are directed to the same direction. Second tarsal segment provided with a few very long, fine, sharp pointed, drooping hair.

Abdomen.—Cornicles approximately .028mm. high. Base of Cornicles about 0.71mm. with only one hair a condition which is hardly typical of the genus. The rim of the cornicles shows considerable flare. Dorsum of abdomen with comparatively few coarse short hair and these for the most part arranged in transverse rows. The row being rather well defined towards the posterior, there being five distinct rows from the cauda forward and two less distinct rows forward of these. Ventral surface of abdomen with fine long irregularly arranged hair. The cauda and anal plate are characteristic of the genus as regards shape, both are provided with two kinds of hair, a very long slightly curved, coarse type on the margins and a decidedly shorter and much finer type on the dorsum.

Apterous viviparous female.

Size and general color.—Length from vertex to tip of anal plate 2.38mm. Width of head through the eyes. 457mm. Color approximately that of alate viviparous female with head, thorax and legs slightly darker.

Head and thorax.—Comparative lengths of antennal segments as follows: III .347mm., IV .128mm., V .143mm., VI .1 + .028mm. There are no secondary sensoria. In other respects the antennae are suggestive of the alate viviparous female. Rostrum exceedingly short, just failing to reach the coxae of the mesothoracic pair of legs. Ocular tubercles present but not well developed. Hind tibiae 1.85mm. long. Hair on inner and outer margins of tibiae approximately the same in quality rather dull at the tip, and for the most part but little more than half the width of the tibiae in length. Hind femora as in alate viviparous female. Length of hind tarsi .347mm. with the hair similar to that found in alate viviparous female.

Abdomen.—Cornicles lower than those of alate viviparous female with the base not much larger than the width of the cornicle at the apex. Width of base of cornicle about .07mm. height of cornicle about .028mm. Outer rim of base of cornicle irregular and somewhat indistinct. Rim of base of cornicle associated more or less with from one to three hair. Rim of cornicles near apex poorly developed, and non flaring. Cauda and anal plate as in alate viviparous female. The cornicles of this form could perhaps be best described as almost ring-like. It is strange that they differ from those of the alate form.

Holotype alate viviparous female mounted on same slide with the apterous viviparous female which is made morphotype. This slide has been deposited in the United States National Museum. Data associated with this species: Host *Pinus arizonica*. This species of pine is considered by some to be a variety of *Pinus ponderosa*. Chiricahua Mountains, Arizona, 8,000 ft. elevation. June 23, 1933, by O. Bryant.

This species does not fit well the genus in which it is being placed, as that genus is now conceived. For example the cornicles of the apterous

viviparous female can hardly be referred to as shallow hairy cones, nor can those of the alate form be considered hairy. There are objections to placing the species in the genus *Eulachnus* as characterized by Baker. Dr. Börner has recently described as new, several species which he has placed in the genus *Eulachnus*. Some of the species described by Dr. Börner can hardly be considered as belonging to the genus *Eulachnus* in the sense that Baker thinks of it. For example at least one of the species has minute hair on the vertex and antennae and another has the cornicles on shallow but not hairy cones, all however have long hair on the dorsum of the first segment of the tarsus in common with the type of the genus *Eulachnus* which is *Lachnus agilis* Kalt. *Schizolachnus tusoca* differs from *Schizolachnus pini-radiatae* (Davidson) by the shorter hair on the antennae and legs, by the almost peg-like hair on the inner margin of the metathoracic femora, by the darker legs, and fewer hair associated with the cornicles. It agrees with *pini-radiatae* in the lack of long hair on the dorsum of the first segment of the tarsus. Baker in his Generic Classification of Aphididae places the genus *Schizolachnus* in the Subtribe Lachnina. This seems strange. It would appear more logical to place both the genus *Schizolachnus* and the genus *Unilachnus* in the Subtribe Eulachnina and emphasize the obtuse rostrum so characteristic of other Eulachnina. When so placed the genus *Eulachnus* differs from the genus *Schizolachnus* most conspicuously by the presence of hair on the dorsum of the first segment of the tarsus and the more feebly developed ocular tubercle; factors hardly sufficient to differentiate genera. The description of the genus *Eulachnus* was published in 1909 as was that of the genus *Schizolachnus*, despite the fact that both works in which the two genera were described bear the date 1908. The genus *Eulachnus* was described on p. 329, and the genus *Schizolachnus* on p. 375. The genus *Eulachnus* would therefore have page priority should it not be possible to determine the actual mailing date of the two publications were one to combine the two genera.

Cinara tonaluca, new species

Apterous viviparous female.

Size and general color.—Length from vertex to tip of anal plate varying from 2.14-2.57mm. with larger sizes predominating. Width of head through the eyes .57-.62mm. Data on color not available the specimens having been cleared and strained. General color of head thorax and abdomen apparently the same, ostensibly light. Antennae dusky. Segments four and five of rostrum dark brown, third segment more or less spotted. Femora quite uniformly dusky-brown. Tibiae apparently pale except for apical region which is concolorous with tarsi which are dusky brown. The spiracles appear to be surrounded by small brownish areas similar to the base of the cornicles. Cauda dusky brown as is a small area just anterior to it. Dorsal lateral area of abdomen with a few small brown spots. These suggest wax glands.

Head and thorax. Relative length of antennal segments as follows: III .21-.27mm. with the longer lengths predominating, IV .10-.128mm., V .128-.171mm. always longer than IV, VI .057-.085 + .042-.057mm. Secondary sensoria one, confined to middle of segment V rather small and only slightly tuberculate. Antennal hair rather sparse, that on

anterior margin longest, being about half again as long as the segment is wide. Hair on third antennal segment very upright that on remaining segments slightly more inclined but still forming a large angle with side of segment. All segments smooth except unguis. Rostrum long, almost reaching base of cornicles. Hind tibiae .75-1.14mm. long, each measurement representing a single extreme case, as a rule more than 1.01mm. Hair on outer margin of tibiae slightly longer than width of tibiae very upstanding, inner hair on hind tibiae finer, somewhat shorter and more inclined. The hair near the apex of the tibiae more inclined than that above. Hind tarsi .185-.214mm. in length. First tarsal segment with 7-9 hair.

Abdomen.—Abdomen clothed with many rather long hair. Base of cornicles varying from .10-.114mm. provided with one kind of hair. Cauda, rather shallow.

Alate viviparous female.

Size and general color.—The length from vertex to tip of anal plate varies from 2.28-2.43mm. Data on color not available but apparently similar to that of apterous viviparous female.

Head and thorax.—Antennal segments with the following comparative lengths: III .286-.30mm., IV .128mm., V .143-.157mm., VI .071 + .042 mm. Secondary sensoria limited to one or less on III and one on V. Both sensoria are small and only slightly tuberculate. Hair on antennae similar to that on apterous viviparous female. Rostrum as in apterous viviparous female. Hind tibiae 1.17-1.22mm. long. Hair on hind tibiae shorter than that in apterous viviparous female, being subequal to width of segment and slightly more inclined than that of the apterous form. Hind tarsi .21-.228mm. long. First tarsal segment with as many as ten hair. Media of fore wings twice branched, second branch of media closer to margin of wing than to the first branch. Media and branches very faint. Stigma rather dark, scale-like. No veins reach the margin of the wing.

Abdomen.—Base of cornicles about .128mm. wide. Height of cornicles about .071mm. Abdomen with numerous long sharp pointed hair. Surface of abdomen very finely imbricated. Cauda and anal plate as in the apterous viviparous female.

Holotype alate viviparous female. Morphotype apterous viviparous female. Holotype and morphotype mounted on the same slide, which has been deposited in the United States National Museum. There are several paratype slides. Host *Juniperus monosperma*. The material was collected by L. P. Wehrle at Tucson, Arizona, July 13, 1943.

This species keys to the first FF couplet page 845 in Gillette and Palmers key, *Annals Entomological Society of America* vol. XXIV except that rostrum is shorter than the body. From *Cinara pulverulens* it differs in host, sensoria, and length of hair on the hind tibiae in alate. From *Cinara fornacula* it differs in host, size, and character of hair on hind tibiae. From *Cinara juniperensis* it differs in specific host, sensoria, media and in the size of the base of the cornicles, length of hair on the hind tibiae and their angle.

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ARIZONA APHIDIDAE

BY F. C. HOTTES AND W. P. WEHRLE

The species of Aphididae described herewith are from the extensive collection of slides of that family brought together by Dr. Wehrle. This is the first of a projected series of papers on the Aphididae of Arizona. Unfortunately Dr. Wehrle died while this paper was in process in the hands of the senior author, who takes this opportunity to express his loss of a very able colleague whose untimely death prevented him from publishing much from his extensive investigations.

Wapuna new subgenus.

Similar to the genus *Aphis* except that the anterior margin of the head is somewhat broader and more flattened, and apparently the entire lack of the anal plate in the apterous viviparous female, and the very shallow and minute anal plate in the alate viviparous female.

Type *Wapuna tahosalea* new species.

Aphis (*Wapuna*) *tahosalea* new species.

Apterous viviparous female.

Size and general color.—Length from vertex to tip of abdomen varying from 1.11-1.57mm. The smaller sizes are more numerous. Data on color not available the mounted specimens having been cleared and stained. Color apparently pale, perhaps yellow or pale green with the head and thorax more or less light dusky. Antennae pale dusky, legs pale except for the apical portions of the tibiae and tarsi which are light dusky-brown. Cornicles, cauda, and spot anterior to cauda light brown. Apical segment of abdomen brown, this at times takes on the appearance of a pseudo anal plate.

Head and thorax.—Comparative lengths of antennal segments as follows: III .21-.286mm., IV .14-.18mm., V .15-.17 mm., VI .10-II + .24mm. There are no secondary sensoria. All antennal segments imbricated the imbrications being rather well developed. Antennal hair very sparse and less than one half of the width of the segment in length. Median anterior margin of head flat, with lateral portions somewhat raised suggesting low lateral tubercles, these are far removed from the first antenal segment which is well developed and almost out of proportion to the rest of the segments. The rostrum is extraordinarily long always extending well beyond the metathoracic pair of coxae to the mid region of the abdomen and in some cases almost to the base of the cornicles. The last segment of the rostrum is subequal to the length of the cauda. The prothorax is provided with a pair of lateral tubercles. The hind tibiae vary from .57-.78mm. in length. The hind tarsi are

.10mm. in length. The hair on the outer margin of the hind tibiae is much sparser and shorter than the hair on the inside margin. On the proximal third of the tibiae the hair are very scarce.

Abdomen.—The surface of the abdomen is imbricated. Lateral portions of the abdomen with few if any hair, these when present short and fine. Dorsum of abdomen with a few scattered long sharp pointed hair, these have their origin from small surface elevations. First abdominal segment with a pair of lateral tubercles, there is a similar pair posterior to the cornicles. Cornicles .17-.25mm. long, rather wide at the base, tapering to a poorly developed rim at the apex. The inner margin of the cornicles is almost straight the outer margin is slightly curved. The cornicles are coarsely imbricated. Cauda .128mm. long. The cauda is constricted just anterior to the middle, as a rule it has two strongly incurved hair on a side, its surface is setulose. Anal plate apparently absent. The posterior margin of abdomen with a few well developed hair.

Alate viviparous female.

Size and general color.—Length from vertex to tip of abdomen varying from 1.25-1.78mm. With the smaller sizes more abundant. Width of head through the eyes. 32mm. Data on color not available, probably light green or yellow, with small dusky areas at sides and a few similar smaller ones on the dorsum. Dusky areas just anterior to base of cornicles largest. Area just anterior to cauda more or less dusky. Cornicles and cauda brown. Head and thorax light dusky. Color of legs and antennae similar to those of apterous viviparous female.

Head and thorax.—Proportional lengths of antennal segments as follows: III .214-.286mm., IV .157-.17mm., V .14-.17mm., VI .10-.11 + .24-.25mm. Secondary sensoria confined to a row on third segment, large, with wide rims, far apart, extending throughout length of segment. Antennal hair sparse, ultra short and fine. All antennal segments imbricated. Anterior margin of head broad and flat except for median tubercle. Rostrum long extending to or beyond middle of abdomen, often almost reaching to base of cornicles. Second branch of media much closer to margin of wing than to the first branch. Prothorax with a pair of lateral tubercles.

Abdomen.—Imbrications and hair similar to those on apterous female. Apparently no lateral tubercles on the first abdominal segment. Tubercles posterior to the cornicles very small. Cornicles .11-.14mm. long, less wide at the base than those of the apterous female. Cauda .128mm. long constricted near middle with two pair of strongly incurved hair. Anal plate almost absent and always difficult to determine.

Holotype slide with alate and apterous viviparous females deposited in the United States National Museum. This species was collected on *Bryophyllum pinnatum* by L. P. Wehrle Jan. 10, 1944, at Tucson, Arizona.

Because of the strongly incurved hair on the cauda, the shape of the cauda, and the secondary sensoria a quick glance at this species suggests *Aphis gossypii* Glover, from which it can be separated at once by the longer rostrum and the absence or poor development of the anal plate.

Aphis piutapa, new species*Apterous viviparous female.*

Size and general color.—Length from vertex to tip of anal plate 1.31 mm. width of head through the eyes .35mm. Data on color not available. Head thorax and abdomen apparently the same color and free from duskiness. Most likely color light green. Antennae pale with the exception of the apical portions of segments V and VI which are light dusky. Legs light dusky with the apical portions of the tibiae and all of the tarsi darker. Cauda and cornicles pale dusky.

Head and thorax.—Proportional lengths of antennal segments as follows: III .21mm., IV .20mm., V .20mm., VI .085 + .057mm. Third antennal segment very lightly imbricated, segments IV V and VI progressively more so. Antennal hair almost absent, very fine, and ultra short. There are no secondary sensoria. Anterior margin of head broad and rather flat, provided with four short hair. The rostrum reaches the coxae of the metathoracic pair of legs. Tibiae with very fine short and exceedingly sparse hair on proximal three fourths. Hair on apical fourth longer but still sparse. Length of hind tibiae .757mm. Length of hind tarsi .128mm. Prothorax with a pair of lateral tubercles.

Abdomen.—Abdomen apparently without lateral tubercles. Surface of abdomen very faintly imbricated. Abdominal hair almost absent, very fine and extremely short. Cornicles .085mm. long feebly imbricated with the sides very slightly curved. Rim at apex of cornicles poorly developed. Cauda longer than the cornicles measuring .157mm. in length, very slightly constricted near middle, sides with three hair. The cauda has a well developed setulose surface. Anal plate broadly rounded.

Alate viviparous female.

Size and general color.—Length from vertex to tip of anal plate 1.31 mm. or equal to the length of the apterous viviparous female. Width of head through the eyes .343mm. Data on color not available. Head and thorax brown. Antennae dusky, femora dusky-brown, tibiae dusky with apical portions and tarsi dusky-brown. Cornicles pale dusky. Cauda dusky except for a clear area near base.

Head and thorax.—Comparative length of antennal segments as follows: III .214mm., IV .143mm., V .128mm., VI .085 + .057 mm. Secondary sensoria limited to the third antennal segment, irregular in size, arranged in a straight but very much crowded row on apical two thirds of segment. The secondary sensoria number eight to ten. The third antennal segment is comparatively smooth, remaining segments distinctly imbricated. Antennal hair almost absent and so fine and short that it is difficult to see. Rostrum just reaching coxae of metathoracic pair of legs. Anterior margin of head rather broad and flat, provided with four fine hair. Prothorax with a pair of lateral tubercles. Second branch of media much closer to margin of wing than to first branch. Veins of wings pale dusky. Stigma long and narrow, dusky in color. Hind tibiae .77mm. long. Hair on hind tibiae if anything more sparse than that on apterous viviparous female, in other respects much the same except that it is not longer at the apex.

Abdomen.—Segment posterior to cornicles provided with a pair of

very small lateral tubercles. Hair on abdomen almost absent, very short and fine. Cornicles .057mm. long, slightly imbricated the sides almost straight, the rim is poorly developed. The cauda is .128mm. long or much longer than the cornicles, its surface is setulose, it is slightly constricted just before the middle. There are three hair on one side and two on the other. The anal plate is similar to that of the apterous viviparous female.

The uncommonly short unguis and the fact that the cornicles are much shorter than the cauda separate this species at once from most other species of the genus *Aphis*. This condition prevails in *Aphis minutissima* G. & P. but in this species segments four and five of the rostrum are conspicuously slender and the cornicles and cauda differ. Because of the short unguis this species is also suggestive of *Aphis tetrapteralis* Cockerell known to me only by the figure and description by Gillette and Palmer. From this species *piutapa* differs, in size, the less acute cauda with fewer lateral hair, a larger number of secondary sensoria, shorter rostrum, and the second work of the media much closer to the margin of the wing. The host plants of the two species also differ.

Holotype alate viviparous female. Morphotype apterous viviparous female. Deposited in United States National Museum. Holotype and morphotype mounted on one slide and representing so far as known all material. Host *Lycium parviflorum*. Collected at Tucson, Arizona, April 23, 1935, by R. B. Streets.

Aphis wahena new species

Apterous viviparous female.

Size and general color.—Length from vertex to tip of anal plate varying from 1.7-1.47mm. Color notes not available, but the species was referred to as being black. Color of head thorax and abdomen of mounted specimens similar and very dark in life most likely black as described. Entire antennae, legs, cornicles and all of cauda except the median dorsal portion anterior to constriction which is pale, black.

Head and thorax.—Comparative length of antennal segments as follows: III .314-.328mm., IV .185-.214mm., V .143-.171mm., VI .07-1 + .171-.30mm. Secondary sensoria distributed as follows: III 3-5 most common number 3, IV 6-10 as a rule 7 or more, V 1-4 as a rule 2 or 3. The secondary sensoria are small, have wide rims and are only slightly tuberculate. On III the sensoria are arranged in a row on the apical third of segment, on IV they are arranged in a row with the exception of two or three, on this segment they extend from end to end of the segment. On IV it is common for two or three sensoria to be grouped very close together. On V when the sensoria number more than one they are far apart and arranged in a row. All antennal segments are coarsely imbricated. Antennal hair minute and very sparse. The rostrum extends to just beyond the metathoracic coxae. Segments IV and V of the rostrum are slightly longer than the hind tarsi, segment four is rather thin but not needle-like. The anterior margin of the head is rather broad and slightly convex it carries several very minute hair. The prothorax is provided with a pair of lateral tubercles. The hind tibiae measure about .786mm. in length. The hair on the outer margin

of the hind tibiae is very sparse and equally distant throughout the length of the tibiae, with the exception of the hair at the apex it is about one half the width of the tibiae in length. The hair on this margin is much inclined. The hair on the inner margin of the tibiae is less inclined, longer and about two times as abundant as that on the outer margin. The hind tarsi are .1mm. long.

Abdomen.—The first segment of the abdomen is provided with a pair of small lateral tubercles, a similar pair is located posterior to the cornicles. The surface of the abdomen is very finely imbricated, the imbrications being very close together. Abdominal hair very sparse, minute and very fine, similar to that on antennae. The cornicles vary in length from .347-.371mm. being exceptionally long for an *Aphis*. The cornicles are very coarsely imbricated throughout, a rim is present at the apex but this is not well developed. The cornicles show a tendency to bend outwardly and with the exception of a wide area at the base have a fairly uniform width. The cauda is .143mm. long, its surface is coarsely setulose. The cauda is constricted near the middle, and most specimens show a secondary constriction near the apex, each side is provided with two strongly incurved hair.

Alate viviparous female.

Size and general color.—Length about .929mm. Data on color not available but apparently similar to apterous viviparous female in all respects, however some mounted specimens appear lighter in color than others.

Head and thorax.—Comparative length of antennal segments as follows: III .314-.371mm., IV .185-.214mm., V .157-.185mm., VI .071 + .314mm. Secondary sensoria distributed as follows: III 12-15 irregularly arranged but confined more or less to one side of segment. IV 6-9 irregularly arranged but confined largely to one side. V 3-4 irregularly spaced, but more or less in a row. All sensoria comparatively large, with wide rims, only slightly tuberculate. All antennal segments coarsely imbricated. Antennal hair minute, and sparse. Rostrum extending slightly beyond the coxae of the metathoracic pair of legs, fourth segment almost two times length of base of VI. Anterior margin of head convex with a median tubercle, provided with minute hair. Prothorax with a pair of small lateral tubercles. Hind tibiae .929mm. long with hair similar to that of apterous viviparous female. Stigma pale dusky with a scale-like surface, rather narrow. Radial sector little bowed. Second branch of media much closer to margin of wing than to first branch. No veins reach the margin of the wing. Veins pale lightly bordered with dusky.

Abdomen.—First abdominal segment and segment posterior to cornicles provided with a pair of small lateral tubercles. Cornicles .30mm. long otherwise as in the apterous viviparous female. Cauda as in apterous viviparous female. 11-14mm. long.

The cornicles of this species are almost exact duplicates of the cornicles of *Aphis illinoisensis* Shimer. The antennae except for sensoria and relative lengths of segments are also suggestive of *illinoisensis*, however the cauda differs from that species not only in shape but in number of

hair. From *Aphis nyctalis* H&F it can be quickly separated by the cauda hair, and much longer cornicles.

The type slide of this species has been deposited in the United States National Museum, it contains both alate and apterous viviparous females. Data associated with this species. Collected by L. P. Wehrle, Ramsey Canyon, Huachuca Mountains, Arizona, August 10, 1949. Host *Viguiera cordifolia*.

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THE TAXONOMIC STATUS OF THE POCKET GOPHERS,
GEOMYS BURSARIUS AND *GEOMYS BREVICEPS*

BY ROLLIN H. BAKER AND BRYAN P. GLASS

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Mechanical College*

The two pocket gophers, *Geomys bursarius* and *Geomys breviceps*, are currently classified as two full species. The history of the taxonomic work that has resulted in the present arrangement of these two alleged species (and their respective subspecies) can be followed by consulting: 1. Davis (Texas Agric. Exp. Sta., Bull. 590:1-38, October 23, 1940), 2. earlier literature cited by Davis (*op. cit.*), 3. Villa and Hall (Univ. Kans. Publ., Mus. Nat. Hist., 1:217-236, November 29, 1947), and 4. Baker (Jour. Mamm., 31:348-349, August 21, 1950).

The two kinds, *G. bursarius* and *G. breviceps*, have not been reported as taken at the same place and their ranges were not known to overlap. In the University of Kansas Museum of Natural History there were, from Oklahoma, specimens of *Geomys breviceps dutcheri* from Tecumseh, Pottawatomie County, and specimens of *Geomys bursarius major* from Norman, Cleveland County, only thirty miles to the westward. To learn whether these two pocket gophers came together and whether intergradation occurs between them, a field party from the University of Kansas Museum of Natural History,* in November, 1949, collected at ten stations fairly evenly spaced between the two places mentioned above. *Geomys* was taken at all ten stations (31 specimens in all) and was found to have a continuous distribution in the area concerned. Study of the specimens shows that intergradation occurs between the two alleged species. Additional collecting by one of us (Glass) discloses that these two alleged species of *Geomys* meet along a broad front extending from within Pawnee County on the north into McClain County on the south. Glass intends to show, in a later paper, the distribution of these pocket gophers in detail.

According to Davis (*op. cit.*) the two alleged species differ in two characters: In *Geomys bursarius* (= *lutescens* in Davis) the hind foot is more, instead of less, than 30 mm. long, and the length of the dorso-lateral exposure of the jugal is more, instead of less, than the width of the rostrum measured ventral to the infraorbital openings. In specimens taken between Norman and Tecumseh the hind foot varies in length from 27 to 32 mm. In some of these specimens the length of the jugal is more than the width of the rostrum measured ventral to the

*Assistance with field work is acknowledged from the Kansas University Endowment Association.

infraorbital openings, in other specimens the reverse relation exists, and in others the two measurements are approximately equal. In addition to the two differences mentioned by Davis, *Geomys bursarius major* has larger nasals, rostrum and auditory bullae than *G. breviceps dutcheri*. Specimens from the thirty-mile transect show intergradation in each of these features. From the evidence given above we conclude that *Geomys breviceps* and *Geomys bursarius* are conspecific; the older specific name, *bursarius*, will apply.

Specimens from Oklahoma studied are all in the University of Kansas Museum of Natural History. Of *Geomys bursarius major*, 9 were examined from the following localities: *Cleveland County*: Norman, 4; .4 mi. E Norman, 2; 1.4 mi. E Norman, 2; 2 mi. E Norman, 1. Of *Geomys bursarius dutcheri*, 29 were examined from the following localities: *Cleveland County*: 3.5 mi. E Norman, 4; 7.2 mi. E Norman, 3; 12 mi. E and 1 mi. N Norman, 6; 17.2 mi. E and 1 mi. N Norman, 2; *Pottawatomie County*: 6.5 mi. W Tecumseh, 5; 1 mi. W Tecumseh, 2; .5 mi. W Tecumseh, 4; Tecumseh, 3.

Currently recognized subspecies of *Geomys bursarius*, together with citations to original descriptions and type localities, may be arranged as follows:

Geomys bursarius bursarius (Shaw).

1800. *Mus bursarius* Shaw, Trans. Linn. Soc. London, vol. 5, p. 227.

Type Locality.—Elk River, Sherburne County, Minnesota, *ex* Swenk, Missouri Valley Fauna, No. 1, p. 6. 1939.

Geomys bursarius illinoensis Komarek and Spencer.

1931. *Geomys bursarius illinoensis* Komarek and Spencer, Jour. Mamm., vol. 12, p. 405. November 11, 1931.

Type Locality.—One mile south of Momence, Kankakee County, Illinois.

Geomys bursarius majusculus Swenk.

1939. *Geomys bursarius majusculus* Swenk, Missouri Valley Fauna, No. 1, p. 6. December 5, 1939.

Type Locality.—Lincoln, Lancaster County, Nebraska.

Geomys bursarius levisagittalis Swenk.

1940. *Geomys lutescens levisagittalis* Swenk, Missouri Valley Fauna, No. 2, p. 4. February 1, 1940.

Type Locality.—Spencer, Boyd County, Nebraska.

Geomys busarius hylaeus Blossom.

1938. *Geomys lutescens hylaeus* Blossom, Occas. Papers, Mus. Zool., Univ. Michigan, No. 368, p. 1. April 6, 1938.

Type Locality.—Ten miles south of Chadron, Dawes County, Nebraska.

Geomys bursarius vinaceus Swenk.

1940. *Geomys lutescens vinaceus* Swenk, Missouri Valley Fauna, No. 2, p. 7. February 1, 1940.

Type Locality.—Scottsbluff, Scotts Bluff County, Nebraska.

Geomys bursarius lutescens Merriam.

1890. *Geomys bursarius lutescens* Merriam, North Amer. Fauna, No. 4, p. 51. October 8, 1890.

Type Locality.—Sand hills on Birdwood Creek, Lincoln County, Nebraska.

Geomys bursarius jugossicularis Hooper.

1940. *Geomys lutescens jugossioularis* Hooper, Occas. Papers, Mus. Zool., Univ. Michigan, No. 420, p. 1. June 28, 1940.
- Type Locality.—Lamar, Prowers County, Colorado.
- Geomys bursarius industrius* Villa and Hall.
1947. *Geomys bursarius industrius* Villa and Hall, Univ. Kansas Publ., Mus. Nat. Hist., vol. 1, no. 11, p. 226. November 29, 1947.
- Type Locality.—One and one-half miles north of Fowler, Meade County, Kansas.
- Geomys bursarius major* Davis.
1940. *Geomys lutescens major* Davis, Texas Agric. Exp. Sta., Bull. 590, p. 32. October 23, 1940.
- Type Locality.—Eight miles west of Clarendon, Donley County, Texas.
- Geomys bursarius texensis* Merriam.
1895. *Geomys texensis* Merriam, North Amer. Fauna, No. 8, p. 137. January 31, 1895.
- Type Locality.—Mason, Mason County, Texas.
- Geomys bursarius llanensis* Bailey.
1905. *Geomys breviceps llanensis* Bailey, North Amer. Fauna, No. 25, p. 129. October 24, 1905.
- Type Locality.—Llano, Llano County, Texas.
- Geomys bursarius dutcheri* Davis.
1940. *Geomys breviceps dutcheri* Davis, Texas Agric. Exp. Sta., Bull. 590, p. 12. October 23, 1940.
- Type Locality.—Fort Gibson, Muskogee County, Oklahoma.
- Geomys bursarius breviceps* Baird.
1855. *Geomys breviceps* Baird, Proc. Acad. Nat. Sci. Philadelphia, vol. 7, p. 335.
- Type Locality.—Prairie Mer Rouge, Morehouse Parish, Louisiana.
- Geomys bursarius brasensis* Davis.
1938. *Geomys breviceps brasensis* Davis, Jour. Mamm., vol. 19, p. 489. November 14, 1938.
- Type Locality.—Five miles east of Kurten, in Grimes County, Texas.
- Geomys bursarius pratincolus* Davis.
1940. *Geomys breviceps pratincolus* Davis, Texas Agric. Exp. Sta., Bull. 590, p. 18. October 23, 1940.
- Type Locality.—Two miles east of Liberty, Liberty County, Texas.
- Geomys bursarius attwateri* Merriam.
1895. *Geomys breviceps attwateri* Merriam, North Amer. Fauna, No. 8, p. 135. January 31, 1895.
- Type Locality.—Rockport, Aransas County, Texas.
- Geomys bursarius ammophilus* Davis.
1940. *Geomys breviceps ammophilus* Davis, Texas Agric. Exp. Sta., Bull. 590, p. 16. October 23, 1940.
- Type Locality.—Cuero, De Witt County, Texas.
- Geomys bursarius sagittalis* Merriam.
1895. *Geomys breviceps sagittalis* Merriam, North Amer. Fauna, No. 8, p. 134. January 31, 1895.
- Type Locality.—Clear Creek, south end Harris County, Texas.
- Geomys bursarius terriculus* Davis.
1940. *Geomys breviceps terriculus* Davis, Texas Agric. Exp. Sta., Bull. 590, p. 17. October 23, 1940.

58 *Proceedings of the Biological Society of Washington*

Type Locality.—One mile north Texas City, Galveston County, Texas.
Geomys bursarius ludemani Davis.

1940. *Geomys breviceps ludemani* Davis, Texas Agric. Exp. Sta.,
Bull. 590, p. 19. October 23, 1940.

Type Locality.—Seven miles southwest of Fannett, Jefferson County,
Texas.

Transmitted November 30, 1950.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

GENERAL NOTES

CARPENTER FROG, *RANA VIRGATIPES*, ON THE COASTAL
PLAIN OF MARYLAND

The carpenter frog, a "coastal plain endemic," as Conant (Maryland. A Journal of Natural History, 17: 72-73, 1947) refers to it, has been reported from Maryland only three times, so far as this writer has been able to ascertain.

Conant (*loc. cit.*) reported the first Maryland specimen of this species from near the edge of Blackwater Wildlife Refuge, in southern Dorchester County, April 10, 1947. A second record was made by William Pruitt and the writer while camping in the Pocomoke Swamp, approximately 100 yards below the Delaware state line, on the night of June 12, 1948. The habitat at this station in the Pocomoke was a sphagnum bog on the upland side of the swamp. Throughout the night it was the only creature heard.

A single carpenter frog was heard by Catesby Jones and the writer in the vicinity of Blackwater Refuge, on November 20, 1948. This late date constitutes the third record for the State.

It may be of interest to note that Robert Stewart and the writer procured six of these frogs in a burned-over section of the Pocomoke Swamp half a mile north of the Maryland state line in Delaware, on the night of April 20, 1948. This location lies between the towns of Selbyville and Gumboro, Delaware.

A southern species, this is but one of a number of Austro-riparian animals and plants that occur in the Pocomoke Swamp. Some other examples are Swainson's Warbler (*Limnothlypis swainsonii*), Red Bay (*Persia borbonia*), Horse Sugar (*Symplocos tinctoria*), Cross-vine (*Bignonia capreolata*), and Bald Cypress (*Taxodium distichum*).

BROOKE MEANLEY

EUMECES LATICEPS (SCHNEIDER) IN THE ALLEGHANIAN
ZONE OF MARYLAND

Published records for the occurrence of *Eumeces laticeps* in Maryland list this species principally from the Coastal Plain province.

It is known to occur in St. Mary's County in southern

Maryland, and at various points east of the Chesapeake Bay, on the "Eastern Shore," where the writer, accompanied by John Hamlet, has seen as many as ten (10) individuals of the species in a day, near Centerville. Its habitat at this locality was composed mainly of an oak-beech overstory, with a scattering of laurel and blueberry in the shrub stratum. Scattered throughout the woods were a number of dead chestnut stumps and windfalls in which the reptile lived.

Recently, J. A. Fowler (Proc. Biol. Soc. Washington, 59: 165, 1946) reported the occurrence of *Eumeces laticeps* on the Piedmont Plateau, 2½ miles above Seneca, in Montgomery County.

The known range of the species can now be extended westward, into the Blue Ridge, where it is probably fairly common.

On May 23, 1948, the writer, accompanied by Maurice and Jack Zardus and Paul Anderson, captured a specimen at the top of Sugar Loaf Mountain, an outlier of the Catoctin Mountains, in Frederick County.

Approximately a year later, May 15, 1949, the same party observed two of these large skinks on Elk Ridge at Weverton (near Harper's Ferry, W. Va.), Washington County, Maryland.

So far as the writer is able to learn, these are the first records for *Eumeces laticeps* from the Alleghanian Zone of Maryland.

BROOKE MEANLEY

NATRIX ERYTHROGASTER IN THE AUSTROPARIAN ZONE OF MARYLAND

McCauley, in his "Reptiles of Maryland and the District of Columbia," gives only two locality records of *Natrix erythrogaster* from Maryland. Both records are from the upper Pocomoke Swamp, a region where this southern snake might be expected to occur, since the Pocomoke is a tongue of Austroriparian element that extends northward through the central-eastern part of the "Del-Mar-Va" Peninsula. The capture by the writer of a large specimen two miles north of Powellville, Maryland, along the Pocomoke River, on April 2, 1950, constitutes a third record for Maryland. The habitat here was a partly drained cypress-gum stand, in which several of the cypress trees measured three feet in diameter.

BROOKE MEANLEY

THE GENERIC NAME OF THE WHITE AND SCARLET IBISES

In 1947 the A.O.U. Committee on Classification and Nomenclature voted to adhere to the International Rules of Zoological Nomenclature rather than the older A.O.U. Code (22nd Supplement to the A.O.U. Check-list, Auk, LXIV, 1947, 445-452). The chief difference between the two codes lay in the so-called "One-letter Rule," whereby the A.O.U. Code considered as homonyms those generic names which differed solely in the gender termination. Adoption of the International Rules necessitated the revival of a number of generic names of North American birds previously rejected as homonyms because of this "One-letter Rule." An additional case of this type, hitherto overlooked, is presented here.

It has been customary in the modern literature to employ *Guara* Reichenbach, 1852, for the White and Scarlet Ibises. There is an earlier name for these birds in *Eudocimus* Wagler (Isis von Oken, 1832: col. 1232); type, by subsequent designation, *Scolopax rubra* Linnaeus (Reichenow, Journ. f. Orn., XXV, 1877, 145). Although *Eudocimus* Wagler was used in such standard works as the Catalogue of the Birds in the British Museum and Sharpe's Handlist, this name was rejected by Stejneger (Auk, I, 1884, 235) on the grounds that it was preoccupied by *Eudocima* Billberg, 1820 (Lepidoptera). While this action was correct according to the precepts of the A.O.U. Code, it becomes unnecessary when following the International Rules. *Eudocimus* Wagler, 1832, is thus available for the White and Scarlet Ibises. This name is not affected by *Eudocimus* Schoenherr, 1836 (Coleoptera), a homonym later amended to *Eudociminus* by Leng (Journ. N.Y. Ent. Soc., XXVI, 1918, 210).

The names of the two species included in the genus thus become as follows:

Eudocimus ruber (Linnaeus), Scarlet Ibis.

Eudocimus albus (Linnaeus), White Ibis.

I am indebted to James L. Peters and to Alexander Wetmore for their advice in connection with the preparation of this note.

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PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW RACE OF PTARMIGAN FROM ALASKA

BY IRA N. GABRIELSON AND FREDERICK C. LINCOLN

In working up the results of his extensive surveys in the Auelians. O. J. Murie commented on the grayer appearance of four ptarmigans from Chuginadak Island, one of the Four Mountain group, and stated that specimens were needed for critical studies of this species in this part of the chain, from Amukta and Yunaska, islands to the west across a wide and deep pass. These islands are separated from Seguum by wide Amukta Pass, and all three—Segaum, Amukta, and Yunaska—are large enough and rough enough to provide suitable ptarmigan habitat. Gabrielson has visited all three (Amukta, June 25, 1940, and June 1, 1946; Yunaska, June 24, 1946; and Segaum, June 29, 1946). He and others of the party saw four Rock Ptarmigan on Yunaska, the only sight of these birds on the three islands in the course of these visits. All were wild, but one, an adult male in post-nuptial plumage, was obtained.

This specimen has been compared with birds from Atka to the west, Chuginadak and Unalaska Islands to the east, and is distinctly different from those on any adjoining area. Although only the one specimen is available, it is so distinctly different that we have no hesitation in naming it as:

Lagopus mutus yunaskensis sub. sp. nov.

Type specimen adult male No. 5583, collection of Ira N. Gabrielson, taken at Yunaska Island, June 24, 1946. Measurements.—Wing 193 mm.; tail 112 mm.; bill from anterior edge of nostril 8 mm.; width at gape 12 mm.; height at gonys 7.50 mm.

In general appearance, *yunaskensis* is nearest to *L. m. nelsoni* but it is much paler and grayer than the grayest specimens in a large series of that race. The back is much less reddish in tone due to the replacement of the fine bars and vermiculations of clove brown by a few even finer brown bars and more scattered vermiculations of cinnamon buff on a much lighter ground color which is almost ashy on the feathers of the lower back. The throat is white, and the breast is slaty with bars of buff or almost white, especially on the ends of the feathers. In comparable plumage, the breast of *nelsoni* is black with numerous clove brown bars.

When compared to *atkinsi* to the west, it is darker throughout, although resembling it in the fine feather markings and the general grayish color of the back. It is, however, darker on the head, breast,

and back than any of the corresponding plumages in a large series of that race.

The four males from Chuginadak are, as Murie pointed out, more grayish and less reddish, especially on the lower back and upper tail coverts, but on the breast they are almost as dark as *nelsoni*. They may represent the darkest variation of *yunaskensis* or they might be considered as the variant of *nelsoni* that approaches most nearly the pale races of the central Aleutians. Additional specimens from Yuaska and Amukta as well as from Herbert or Carlisle (where Gabrielson flushed one bird at long range on July 2, 1946) are needed to determine this relationship.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW VENEZUELAN BIRDS

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

The junior author wishes to thank Mr. J. D. MacDonald, Curator of Birds in the British Museum, for the facilities given him for the examination of the type of *Phylloscartes* (*Leptopogon*) *nigrifrons* (Salvin and Godman).

Study of specimens recently acquired by the Phelps Collection and of comparative material in the American Museum of Natural History, the U. S. National Museum and the Carnegie Museum shows the following new subspecies. We thank the Curators of these museums for permitting us to have access to their collections. Specimens listed are in the Phelps Collection, unless otherwise specified.

Names of colors are capitalized when direct comparison has been made with "Ridgway's Color Standards and Color Nomenclature," 1912.

***Glaucidium brasilianum margaritae*, new subspecies**

Type: From Boca de Río, Isla de Margarita, Nueve Esparta, Venezuela; at sea level. No. 48439, Phelps Collection, Caracas, Venezuela. Adult male (brown phase) collected May 18, 1949, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from large topotypic series of the brown phase of *G. b. phaloenoides* (Daudin) from Trinidad by more numerous and more extensive white markings on back and wings; above more grayish, less brownish; the crown more spotted, less lined; below whiter with narrower striping. The upper parts differ from *G. b. medianum* Todd of Santa Marta, Colombia, in a similar way.

Range: Known only from Margarita Island.

Description of Type: Back and rump Prout's Brown; crown and nape paler; upper tail-coverts more rufous; crown and nape thickly spotted with white and with only a few short white lines on the crown; back and uropygium uniformly spotted with white, the scapulars with large quadrangular white markings; ear-coverts mixed brown and white; gular region white. Chin brown, continuous with color of neck; a whitish area on throat and anterior breast; rest of under parts white streaked with Prout's brown, more heavily on the sides and flanks; axillaries white. Wings darker than Natal Brown; remiges prominently barred with white or buffy; upper wing-coverts prominently barred or spotted with white; under wing-coverts white mixed with dark brown. Tail Prout's Brown, under surface paler with six white bands and tipped narrowly with buffy.

Bill (in life) "greenish yellow"; feet "greenish yellow"; iris "yellow." Wing, 101 mm.; tail 70; exposed culmen, 13; culmen from base 16; tarsus, 22.

Remarks: Sexes alike. Size similar to *phaloenoides*. Range of measurements: three adult males—wing, 88-101 (92.7) mm.; tail 58-70 (62.3);

culmen from base, 16-16 (16); one adult female—wing, 100; tail, 68; culmen from base, 17, two adults of undetermined sex—wing 95, 98 (96.5); tail, 65, 65 (65); culmen from base, 16, 17 (16.5). Measurements of topotypical *phaloenoides* from Trinidad¹: five adult males—wing, 91-98 (94.2); tail 55-62 (58); culmen from base, 15-17 (16); four adult females—wing, 92-96 (93.5); tail (3), 53-59 (56); culmen from base, 15-16 (15.5). Measurements of five topotypical adult males of *G. b. medianum* from Santa Marta¹—wing, 91-95 (93.2).

It is not surprising that there is a paler race in Margarita inasmuch as it is mostly a desert cactus country with little rain, while Trinidad is forested and with heavy rainfall. The Venezuelan mainland population is intermediate and many specimens cannot be separated from those from Margarita but they average closer to *phaloenoides* especially on the under parts.

The Margarita specimens were collected from May 19 to 25 and one on Sept. 5; the Trinidad specimens are dated December, February, March, April, May and June; consequently the dates are partly comparable but the Trinidad series is in fresher plumage. All of the specimens in the Margarita series in the brown phase and the fourteen from Trinidad, also in the brown phase, are comparable in that respect.

Examination of our large series of the species from Venezuela (84) and the specimens of the species in the American Museum of Natural History from Venezuela (22) and Trinidad (29) shows that the subspecies *G. b. duidae* Chapman and *G. b. olivaceum* Chapman from south of the Orinoco River can be separated from *phaloenoides* from Trinidad and northern Venezuela only by their immaculate backs, lacking the more or less spotted backs of the latter. Differences in coloration as noted in the original descriptions of *duidae* and *olivaceum* do not hold.

The differences in color between *olivaceum* and *duidae*, as noted in the original descriptions, are not constant enough to be of diagnostic value; the only difference we can find is that *olivaceum* averages slightly smaller; as stated in the original description the wing averages 3 percent shorter and the tail 5 percent shorter in the two topotypical series. All of the specimens from south of the Orinoco River, except the five from Duida, correspond to the measurements of *olivaceum*. The only specimen from Mt. Huachamacare has a wing of 95 mm. which is within the overlap of the two subspecies, but because of the proximity of this mountain to Mt. Duida we here refer it to *duidae*. As the difference in size averages so little it is possible that a larger series from Mt. Duida might invalidate *olivaceum*. *Olivaceum* is not confined to the Subtropical Zone as ten specimens in our collection are from 500 m. at the base of Mt. Uaipán-tepui and two from 60 m. at El Dorado.

As suggested by Chapman², and by Peters and Griswold³, we consider *G. jardinii* (Bonaparte) a subspecies of *G. brasilianum* (Gmelin) because of their great similarity and because, as far as we know, no subspecies of *brasilianum* and *jardinii* have been found together. The only difference we can find is the more intense, richer, coloration of the latter, a character which we do not consider of specific significance.

¹Specimens in the American Museum of Natural History.

²Descriptions of New Birds from Mt. Duida, Venezuela. Am. Mus. Nov., No. 350, p. 8, Oct. 21, 1929.

³Birds of the Harvard Peruvian Expedition. Bull. Mus. Comp. Zool., 42, No. 4, p. 290, April, 1943.

Specimens Examined

*G. b. cactorem*¹.—MEXICO: Sinaloa, 1♂, 1♀.

*G. b. ridgwayi*¹.—TEXAS: 19. MEXICO: 50. GUATEMALA: 21. HONDURAS: 1. NICARAGUA: 2. COSTA RICA: 13.

G. b. medianum.—COLOMBIA: Santa Marta, 4♂¹, 1♀¹, 2(?)¹, 14 in brown phase⁴; Barranquilla, 1♂¹; N. Antioquia, 2(?)¹.

G. b. margaritae.—VENEZUELA: Margarita Island, brown phase, 3♂ (incl. type), 2♀, 1(?)¹; red phase, 2♂, 1♀.

G. b. phalaenoides.—TRINIDAD¹: brown phase, 15♂, 4♀; red phase, 10♂. VENEZUELA¹: Cristóbal Colón, 1♂, 2♀; Los Dos Ríos, 1♂; Rincón de San Antonio, 2♂; Sal si Puedes, 1♂; Cumanacoa, 1♀; Plain of Cumaná, 1♂; Montaña del Guácharo, 1♂; San Esteban, 1♀; El Limón, Dto. Federal, 2♀; El Cují, 2♀; Lagunillas, 2(?)¹. VENEZUELA: Quebrada Bonita, 1♂; Cerro Negro, Monagas, 1♀; Caripe, 1♂; Bergantín, 1♂; Barcelona, 1♂, 1♀; Santa María de Ipire, 2♂, 1♀, 1(?)¹; Pariaguán, 1♂; El Socorro, 1♂; El Amparo, 1♂; Cerro Negro, Miranda, 1♂; Ocumarito, 1♀; Vallecito, 1♀; Los Teques, 1♂; Altigracia de Orituco, 2♂, 3♀; Las Quiguas, 1(?)¹; Chirigua, 1(?)¹; Quebrada Arriba, 1♀; Carora, 5♂, 1♀; Quiragua, 1♂; Casigua, 2♀; Mene Grande, 2(?)¹; Santa Cruz de Mara, 1♂; Villa del Rosario, 1♂; Río Socuy, 1♂.

G. b. duidae.—VENEZUELA: Cerro Duida¹, 1♂, 4♂ (incl. type); Cerro Huachamacare, 1♂.

G. b. olivaceum.—VENEZUELA: Cerros Roraima, 1♂, 1♀, 3♂¹; Auyan-tepui, 1♂, 5♂ (incl. type)¹; Uaipán-tepui, 8♂, 1♀, 1(?)¹; Aprada-tepui, 1♂; Ptari-tepui, 3♂, 1♀; Guaiquinima, 1♀; Paraque, 2♂; Yaví, 2♂; El Negro, 1♂; also, El Dorado, 1♂, 1♀; Kabanayén, 1♂; Hto. Santa Teresa, 1♂; La Faisca, 2♂, 1♀; La Candelaria, 1♂; Caicara, 1♂; Puerto Ayacucho, 1♂¹; Perico, 1♂¹; Caño Cataniapo, 1♀.

G. b. jardinii.—ECUADOR and PERU: 13, var. locs¹. VENEZUELA: Montañas [Páramo de La] Culata 1♂ (3000 m.), 1♀ (2800 m.)¹, 1♀ (4000 m.)¹; Páramo Escorial (3000 m.), 1♂¹; Sierra Nevada, 1♂ (2000 m.)⁵, 1♂ (3000 m.)¹.

*G. b. ucayalae*¹.—ECUADOR: Pto. Indiana, 1♀; Boca Río Curaray, 1♂. PERU: Sarayacu, 1♀.

*G. b. brasilianum*¹.—ECUADOR: 31. PERU: 6. BRAZIL: 29.

*G. b. tucumanum*¹.—ARGENTINA: Salta, 1♂, 2♀.

*G. b. nanum*¹.—CHILE: 21.

Chamaeza campanisona huachamacarii, new subspecies

Type: From Cerro Huachamacare, Territorio Amazonas, Venezuela; 650 meters, No. 51604, Phelps Collection, Caracas, Venezuela. Adult male collected December 3, 1950, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from the four known Venezuelan forms of *C. campanisona* (Lichtenstein) by more prominent and blacker stripes on underparts, which are also wider and more extensive over the abdomen; pectoral band more prominent, darker and wider, more dusky olivaceous, less

¹Specimens in the Carnegie Museum.

⁴Specimen in the U. S. National Museum.

ochraceous yellow; upper parts and sides of neck more olivaceous, less yellowish or rufous; postocular stripe less prominent.

Range: Known only by the unique type from Cerro Huachamacare in the upper Tropical Zone.

Description of Type: Top of head Antique Brown, exposed centers of feathers dusky giving a scalloped appearance; nape, sides of neck, back and uropygium Dresden Brown; lores slightly ochraceous; postocular stripe narrow, short and inconspicuous; ear-coverts dusky olive. Chin yellowish white; throat Pale Orange-Yellow, darker on sides and posteriorly, faintly speckled centrally and strongly speckled on sides and against breast; a Dresden Brown wash across anterior breast, except in the very center, merging into the heavily black and ochraceous striped sides and flanks; white abdomen more lightly striped with black; under tail-coverts darker than Ochraceous-Buff. Wings Fuscous, paler on the under surface; outer edges of secondaries, entire tertials and exposed parts of upper wing-coverts Dresden Brown uniform with back; under wing-coverts and axillaries white, tipped with dusky. Upper surface of tail Dresden Brown, uniform with the back, a wide black subterminal band; rectrices, except the middle ones, prominently tipped with whitish on the inner vanes; under surface paler and duller.

Bill (in life) "black, base of mandible flesh color"; feet "brown"; iris "dark". Wing, 101 mm; tail, 64; exposed culmen, 20; culmen from base, 27; tarsus, 39.

Remarks: Size similar to *C. c. yavii* Phelps and Phelps, Jr. Measurements of *yavii*: two adult males—wing, 101, 105 mm; tail, 60, 63; culmen from base (1), 26. This species must be rare on the mountains of the Terr. Amazonas as it was not found on Mts. Paraque, Parí or Duida; on Yaví only the two specimens known of *yavii* were found.

The species has a wide altitudinal range in Venezuela. The northern subspecies, *C. c. venezuelana* Ménégau and Hellmayr, ranges in the State of Yaracuy from 30 meters at Taria to 1800 meters at nearby Bucaral. The southern Venezuela races range from the 650 meters of the *huachamacarii* type to the 1800 meters of *C. c. obscura* Zimmer and Phelps on Sororopán-tepui.

Specimens Examined

C. c. venezuelana.—VENEZUELA: Cerro El Cerrón, 6♂, 1♀; Bucaral, 1♂; Colonia Chirgua, 1♀; Taria, 1♂; Las Quiguas, 1♀; Hda. Sta. Clara, 2♂, 1♀; San José de Los Caracas, 3♂; Cerro Golfo Triste, 1♂, 2♀; Cerro Negro, Miranda, 2♂.

C. c. fulvescens.—VENEZUELA: Arabupú, 1♂, 1♀.

C. c. obscura.—VENEZUELA: Cerros Auyan-tepui, 1♂; Ptari-tepui, 6♂, 5♀, 1(?) ; Sororopán-tepui, 2♂, 1♀; Guaquinima, 2♂, 1♀; Acopán-tepui, 1♂, 1♀; Uaipán-tepui, 1♂; Aprada-tepui, 2♂, 1♀; El Negro, 1♂, 2♀.

C. c. yavii.—VENEZUELA: Cerro Yaví, 2♂ (incl. type).

C. c. huachamacarii.—VENEZUELA: Cerro Huachamacare, 1♂ (type).

Phylloscartes chapmani duida, new subspecies

Type: From Cerro Duida, Territorio Amazonas, Venezuela; 1980 meters. No. 51739, Phelps Collection, Caracas, Venezuela. Adult female

collected November 20, 1950, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *P. c. chapmani* Gilliard of Cerro Roraima, and ten other mountains of southern Venezuela, in having a lighter colored crown and back, more yellowish green; the tertials with the terminal spots darker, more buffy, and the edges of the outer webs brighter, more yellowish.

Range: Known only from the unique type from Cerro Duida in the Subtropical Zone at 1980 meters.

Description of Type: Crown, nape, back and rump uniform Serpentine Green; upper tail-coverts slightly ochraceous; forehead and preocular stripe grayish white; ocular ring white; lores and malar region dusky; ear-coverts mixed dusky and greenish. Chin whitish, merging into the pale greenish yellow of throat, breast, sides and flanks, this color merging into the Citron Yellow abdomen; shanks dusky and grayish; under tail-coverts whitish. Wings Fuscous; outer edges of primaries, except the outermost, greenish yellow; secondaries and tertials more widely edged with Lemon Yellow; prominent Cinnamon-Buff terminal spots on outer webs of tertials; two prominent wide Pinkish Cinnamon wing bands; bend of wing Citron Yellow; under wing-coverts and axillaries yellowish white. Tail paler than Benzo Brown, under surface lighter; rectrices narrowly edged externally with greenish yellow.

Bill (in life) "black, base of mandible yellow"; feet "gray"; iris "brown". Wing, 52 mm; tail, 49; exposed culmen, 10; culmen from base, 12.5; tarsus, 16.

Remarks: Size similar to *P. c. chapmani*. Range of measurements of *chapmani*: two adult males from Cerro Roraima (including type)—wing, 59, 61 mm; tail, 53, 54; culmen from base (1), 12; five adult males from Cerro Ptari-tepui—wing, 59-61 (60); tail, 54-55 (54.4); culmen from base (1), 13; five adult females from cerros Ptari-tepui (4) and Chimantá-tepui (1)—wing, 53-54 (53.2); tail, 48-52 (49.4); culmen from base, 12-13 (12.2). Inasmuch as the male *chapmani* is larger than the female it is probable that the same will be found to be the case with the male *duidae* when collected.

P. c. chapmani must be exceedingly rare on Mt. Roraima as it is only known from there by two specimens (including the type) collected by the Peberdy-Pinkus Expedition and now in the Phelps Collection. The species was not collected by our expeditions to the nearby mountains Kukenam and Uei-tepui, nor was it taken on Mt. Roraima by us, nor by Whitely, nor by the Quelch-McConnell, nor by the American Museum of Natural History expeditions. The Phelps Collection has specimens of *P. c. chapmani* from ten of the great sandstone mountains of southern Venezuela (see below). The species is not represented in any other museum.

Specimens Examined

P. c. chapmani.—VENEZUELA: Cerros Roraima, 2♂ (incl. type); Ptari-tepui, 7♂, 7♀, 5(?) ; Sororopán-tepui, 1♂; Chimantá-tepui, 2♂, 1♀, 2(?); Acopán-tepui, 1♂, 1♀; Uaipán-tepui, 2♂, 2♀; Aprada-tepui, 4♂, 2♀; Guaiquinima, 3♂, 1♀; Paraque, 5♂, 5♀, 6(?); Parú, 6♂, 2♀.

P. c. duidae.—VENEZUELA: Cerro Duida, 1♀ (type).

***Phylloscartes nigrifrons maguirei*, new subspecies**

Type: From Cerro Paraque, Territorio Amazonas, Venezuela; 1500 meters. No. 33709, Phelps Collection, Caracas, Venezuela. Adult male collected February 16, 1946, by Ramón Urbano. (Type on deposit at the American Museum of Natural History.)

Diagnosis: Differs from *P. n. nigrifrons* (Salvin and Godman) of Cerro Roraima by more grayish white under parts, lacking the buffy suffusion; by a darker green back; and by paler wing bands.

Range: Known from the Subtropical Zone of Mts. Duida, Paraque, Yaví and Parí in the Terr. Amazonas, and Guaiquinima, Aprada-tepui, Acopán-tepui, Uaipán-tepui and Ptari-tepui in Bolívar; at altitudes between 900 and 1800 meters.

Description of Type: Crown and nape nearest to Neutral Gray; a wide black band across the forehead including the lores; feathers at base of maxilla whitish; back and uropygium Light Cress Green; ear-coverts and malar region mixed dusky and gray. Chin, throat, breast and sides mixed whitish and gray; abdomen whiter, merging into the Sulphur Yellow of flanks, crissum and under tail-coverts; shanks barred dusky and grayish; axillaries whitish. Wings Fuscous; remiges, except outermost, narrowly edged outwardly with Sulphur Yellow, except apically; tertials tipped on outer vanes with white; inner vanes of remiges narrowly edged with whitish except apically; two prominent wing bars Sulphur Yellow; under wing-coverts dusky and whitish. Tail fuscous, the rectrices edged outwardly narrowly with yellowish green; under surface paler and uniform. Bill (in life) "black"; feet "gray"; iris "dark". Wing, 59 mm; tail, 59; exposed culmen, 12; culmen from base, 14; tarsus, 17.

Remarks: Sexes similar in color but females much smaller. Range of measurements from Cerro Paraque: five adult males—wing, 59-64 (62.6) mm; tail, 59-64 (61.8); culmen from base, 13-14 (13.6); five adult females—wing, 52-54 (53.4); tail, 50-54 (52.2); culmen from base, 12-13 (12.6).

To our knowledge only one specimen of *P. n. nigrifrons* exists, the type, which was collected by Whitely on Mount Roraima and described by Salvin and Godman in 1884, and is now in the British Museum. It was examined by the junior author in 1948 and compared with one of our specimens from Mount Paraque, showing the above diagnostic characters against our large series from nine other mountains.

Salvin and Godman say, in the original description⁶: "Mr. Whitely's collection contains only a single male specimen of this peculiar bird, which he shot at an elevation of 5000 feet above the sea, on the slopes of Roraima." Dr. Chapman identified his Mt. Duida series⁷ as *nigrifrons*, apparently without having examined the type. The Mt. Duida specimens are similar to ours from the eight other mountains, except Roraima. The species is common on these mountains but must be exceedingly rare on Mt. Roraima inasmuch as the large collections made there by Quelch and McConnell, the American Museum of Natural History, Peberdy and Pinkus (now in our collection) and by ourselves did not contain any specimens. The nearby mountains, Kukenam and Uei-tepui, also failed to produce the species for our collection.

⁶Notes on Birds from British Guiana, Pt. III. Ibis, p. 446, 1884.

⁷The Upper Zonal Bird-Life of Mts. Roraima and Duida. Bull. Am. Mus. Nat. Hist., 63, Art. 1, p. 94, 1931.

It gives us great pleasure to name this bird after Dr. Bassett Maguire, Curator of the New York Botanical Garden, in recognition of the magnificent work he has been undertaking, collecting the flora of the summits of the mountains inhabited by this new bird. He spent several months on the summit of Mt. Paraque, the type locality of *maguirei*.

Specimens Examined

P. n. nigrifrons.—VENEZUELA: Cerro Roraima, 1 ♂ (type)⁸.

P. n. maguirei.—VENEZUELA: Cerros Paraque, 10 ♂ (incl. type), 5 ♀, 6 (♂); Yaví, 1 (♂); Parú, 1 ♂, 1 (♂) juv.; Duida¹, 1 ♂, 3 ♀; Guaiquinima, 4 ♂, 1 ♀, 2 (♂); Acopán-tepui, 1 ♂, 1 ♀; Uaipán-tepui, 2 ♂, 1 ♀; Aprada-tepui, 2 ♂, 2 ♀, 5 (♂); Ptarí-tepui, 8 ♂, 6 ♀, 5 (♂).



LIST OF LOCALITIES

- | | |
|--------------------------|-----------------------|
| 43 Acopán-tepui, Cerro | 40 Arabupú |
| 22 Altagracia de Orituco | 48 Auyan-tepui, Cerro |
| 46 Aprada-tepui, Cerro | 26 Barcelona |

⁸Specimen in British Museum.

- | | |
|----------------------------|----------------------------|
| 27 Bergantín | 18 Los Teques |
| 12 Bucaral | 33 Margarita, Isla |
| 35 Caicara (Bolívar) | 9 Mene Grande |
| 30 Caripe | 21 Negro, Cerro (Miranda) |
| 10 Carora | 30 Negro, Cerro (Monagas) |
| 4 Casigua | 57 Nevada, Sierra |
| 52 Cataniapo, Caño | 21 Ocumarito |
| 45 Chimantá-tepui | 53 Paraque, Cerro |
| 14 Chirgua, Colonia | 25 Pariaguán |
| 34 Cristóbal Colón | 54 Parú, Cerro |
| 8 Culata, Páramo de la | 51 Perico = Pto. Ayacucho |
| 31 Cumaná, Plain of | 44 Ptari-tepui, Cerro |
| 32 Cumanacoa | 51 Puerto Ayacucho |
| 56 Duida, Cerro | 58 Quebrada Arriba |
| 6 El Amparo | 28 Quebrada Bonita |
| 58 El Cerrón, Cerro | 5 Quiragua |
| 11 El Cují | 29 Rincón de San Antonio |
| 37 El Dorado | 38 Roraima, Cerro |
| 17 El Limón (Dto. Federal) | 32 Sal si Puedes |
| 36 El Negro, Cerro | 15 San Esteban |
| 23 El Socorro | 19 San José de Los Caracas |
| 57 Escorial, Páramo | 16 Santa Clara, Hda. |
| 20 Golfo Triste, Cerro | 3 Santa Cruz de Mara |
| 30 Guácharo, Montaña del | 24 Santa María de Ipire |
| 49 Guaiquinima, Cerro | 41 Santa Teresa, Hato |
| 55 Huachamacarie, Cerro | 1 Socuy, Río |
| 44 Kabanayén | 44 Sororopán-tepui, Cerro |
| 38 Kukenam, Cerro | 13 Taria |
| 42 La Candelaria | 47 Uaipán-tepui, Cerro |
| 42 La Faisea | 39 Uei-tepui, Cerro |
| 7 Lagunillas (Mérida) | 2 Villa del Rosario |
| 15 Las Quiguas | 21 Vallecito |
| 29 Los Dos Ríos | 50 Yavi, Cerro |

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW ALASKAN RACE OF THE WINTER WREN

BY IRA N. GABRIELSON AND FREDERICK C. LINCOLN

In identifying Winter Wrens from Alaska a series of six skins in the Gabrielson collection appear to belong to a previously undescribed race which we have designated as

Troglodytes troglodytes seguamensis sub. nov.
Seguam Winter Wren

Type—No. 5614 (Collection Ira N. Gabrielson), a male collected on Seguam, June 30, 1946.

This is the palest and grayest of all the Aleutian races. In the skins available, the dark tips to the flank feathers are fewer and more scattered than in other races and the breast and belly are gray with little or no rufescence. The back is a lighter (less rufescent) brown than *petrophilus* to the east and more like *tanagensis* to the west, while the underparts are paler than either.

The six specimens on which this race is based, are all in worn breeding plumage. They were taken by Gabrielson as follows: A pair from Seguam, June 30, 1946; 2 females from Amukta, July 1, 1946; and a pair from Yunaska, June 24, 1946.

Average measurements:

2 males—wing 52.75—tail 29.00—exposed culmen—15.25 mm.

4 females—wing 48.25—tail 23.25—exposed culmen—14.94 mm.

Eight adults in comparable plumage from the Islands of the Four Mountains are somewhat more ochraceous on the underparts than these six birds from farther west. They are not as rufescent on the back as the birds from Unalaska, being more the color of *tanagensis*. They are, therefore, somewhat intermediate in color between the type of this race and *petrophilus*, but have the longer bill of this race.

Average of 6 males—wing 52.08—tail—26.00—exposed culmen 15.25 mm.

Average of 2 females—wing 46.25—tail—25.50—exposed culmen 14.00 mm.

The tails of all specimens are badly worn, so this measurement is not significant. Accordingly, although they are not quite as pale as the type of *seguamensis*, the length of the culmen—when compared with an average of 13.8 of ten males and 13.0 of three females of *petrophilus*—indicates that they belong to the former race and are so classified.

PROCEEDINGS
OF THE
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NEW NEOGAEAN WATER-STRIDERS (HEMIPTERA-VELIIDAE)

BY CARL J. DRAKE

The small water-striders of the genus *Microvelia* Westwood, family Veliidae, are not very well known for the Americas. This paper contains the descriptions of seven new species from the neotropical region. The unit of measure employed in the various formulae may be converted into millimeters by dividing by eighty. The types of the new species are in the collection of the author.

***Microvelia munda*, sp. new**

Macropterous form: Very small, dark brown or dark fuscous with a transverse, interrupted, bluish flavous band on front margin of protergum and five or six white spots on hemelytra. Body beneath dark fuscous with bluish tinge.

Size: Length, 1.55 mm.; width, 0.60 mm.

Head: Width across eyes, 0.40 mm. Velvety dark fuscous with impressed median line. Antennae dark brown with basal segment pale, shortly pilose; formula—I, 13; II, 9; III, 14; IV, 25. Rostrum brown with terminal segment dark.

Thorax: Wider than long (50:40, male) (60:44, female). Hind margin of protergum pale with pits visible; median line not very discernible; humeri feebly raised. Legs brown with coxae, trochanters, base of femora above and entire surface beneath testaceous, clothed with short pale hairs. Femora scarcely thickened, unarmed in both sexes; length of hind femora, 0.40 mm.; tibiae, 0.30 mm., long; both middle and hind tarsi with first segment distinctly shorter than second. Hemelytra dark brown with six white marks (outer basal stripe widening apically; inner basal stripe narrower, sometimes interrupted so as to form two spots; three ovate spots just beyond the middle; and an ovate, median, subapical spot); outer margin of hemelytra at base without long hairs.

Abdomen: Length, 0.80 mm. Connexiva brown, largely concealed by hemelytra.

Male narrower than female; venter and genital segments unarmed; genital segments retracted into last venter; first segment above and behind beset with bristly brown hairs.

Type (male) and *allotype* (female), Canal Zone, Panama, Feb. 10, 1939, C. J. Drake.

Separated from *M. summersi* D. & H. and *M. marginata* Uhler by antennal proportions and prominent hemelytral markings.

Microvelia crinata, sp. new

Apterous form: Small, dark brown to dark fuscous-brown with some small silvery spots. Legs with unusually long pale hairs. Protergum with a broad, transverse, brownish band (faintly interrupted at middle) near anterior margin; mesotergum with a shorter, broader, rectangular, brown area; metatergum with a shorter and narrower brown area. Abdomen a little variable in color, usually largely dark brown, sometimes mostly brown; a spot on the side of each thoracic division, one on each side of first two and the last three tergites, and one on each connexival segment silvery. Body beneath brown to testaceous with some scattered silvery hairs.

Size: Length, 2.15 mm.; width, 0.75-0.85 mm.

Head: Width across eyes, 0.35 mm. Deep velvety brown with the characteristic impressed black lines. Rostrum whitish with apex dark fuscous. Antennae rather long, slender, shortly pilose, brown with the basal segment whitish; segments I and II only slightly incrassate, the latter slenderer; III and IV very slender, nearly equal in thickness; formula—I, 26; II, 21; III, 40; IV, 40.

Thorax: Protergum short, not produced over mesotergum, the transverse brown band more or less interrupted at the middle; mesotergum short, about twice as long as metatergum; metatergum nearly as long as protergum, with very little silvery pubescence. Legs brown with coxae, trochanters, base above and entire ventral surface of femora whitish; tibiae beneath pale testaceous. All femora and tibiae of both sexes with unusually long whitish hairs (in both sexes), which stand at right angles to the surface at points of origin; fore femora moderately incrassate, feebly stouter near base than other pairs, the pale hairs nearly one and a half times as long as the diameter of the segment; hind femora not quite as thick as fore pair, most of the long hairs two or slightly more times the diameter of the segment in length; hind femora with long hairs around twice as long as diameter of segment; middle and fore tibiae with both long and short hairs, the long hairs about twice as long as the segment at point of origin on basal half, thence much shorter apically. First tarsal segment of middle legs feebly shorter than second; second tarsal of hind legs scarcely longer than first.

Abdomen: Length, 1.25 mm. Connexiva more or less erect, not reflexed posteriorly; venter unarmed. Last ventral segment of male about one-half longer than the preceding segment. First genital segment plain at base, deeply broadly roundly excavated behind. Female stouter than male.

Macropterous form: Length, 2.40 mm. Velvety black with short brownish pubescence and more prominent silvery hairs and scattered hairs on surface behind humeri; silvery spots on connexiva quite conspicuous. Protergum longer than wide (76:60), moderately convex on disc. Hemelytra brownish black with two long streaks at base, three oval spots at middle and a subapical median spot brownish; without long hairs on exterobasal margin.

Type (apterous male), *allotype* (apterous female) and paratypes (2 apterous and 2 long-winged specimens), Barro Colorado, Canal Zone, Panama, Feb. 6-8, 1939, C. J. Drake.

The small size and extremely long hairs on legs of both sexes separate this insect at once from all other American species of the genus. The long hairs on legs are not as numerous and more than twice as long as in the males of *M. irrasa* Drake and Harris. The female of the latter is very broad, and does not have longly hairy legs.

Microvelia hambletoni, sp. new

Apterous male: Small, black with patches of silvery pubescence or silvery hairs on base of head, protergum, most tergites and connexival segments. Body beneath black with bluish pruinose.

Size: Length, 1.62 mm.; width at base of abdomen, 0.62 mm.

Head: Width through eyes, 0.40 mm. Black with basal part covered with silvery hairs. Rostrum brownish with terminal segment blackish. Antennae moderately stout, dark brown with base scarcely paler, shortly pilose and interspersed with longer hairs; segment I considerably stouter than II, III and IV slendered than two; formula—I, 19; II, 11; III, 22; IV, 26.

Thorax: Protergum covering mesonotum, two and one-half times as wide as long (52:20), the broad flavous stripe extending laterally as far as middle of eyes and covered with silvery hairs; hind margin broadly rounded. Legs rather stout, short, clothed with pale short hairs, testaceous with femora apically and dorsal surface of tibiae brown; femora slightly swollen, unarmed in both sexes; tarsi dark apically, the basal segment in both middle and hind legs much longer (slightly more than twice) than second.

Abdomen: Length, 0.85 mm. Uniformly black with small patches of silvery hairs. Venter unarmed. Genital segment brownish beneath, darker above; first segment beneath broadly impressed at middle basally, there black, feebly emarginate behind. Apterous female unknown.

Macropterous form: Length, 2.00 mm.; width, 0.90 mm. Protergum a little wider than long (36:28); humeral angles not prominent. Hemelytra brown with prominent yellowish white marks (two long basal stripes widening apically; two spots beyond middle; and subapical spot); veins distinct, the pale spots in cells; outer margin near base with a few moderately long brownish hairs.

Type (apterous male), *allotype* (winged female) and one paratype (winged female), Tingo Maria, Peru, Sept. 9, 1944, E. J. Hambleton. In whose honor the insect is named.

The color, size and antennal formula will separate this insect from its congeners. There are also four apterous male paratypes from Nova Teutonia, St. Catarina, Brasil, June 10, 1950, Fritz Plaumann. In some ways this species almost falls into the genus *Xiphoveloidea* Hoberlandt.

Microvelia rasilis, sp. new

Apterous form: Very small, testaceous with some brownish or fuscous areas; joints between segments of tergites and connexiva narrowly dark brown or fuscous. Pubescence very short, inconspicuous.

Size: Length, 1.60-1.70 mm.; width, 0.88 mm.

Head: Width across eyes, 0.41 mm. Antennae brown with basal seg-

ment paler; segment IV feebly thicker than two; formula—I, 14; II, 9; III, 15; IV, 22. Median longitudinal line scarcely visible.

Thorax: Protergum with a few large dark pits, not very long, covering most of mesotergum, concave behind (more so in female than male), three times as wide as median length (40:12), mesotergum narrow, the exposed part about one-third of the length of protergum, with a few large pits; metatergum nearly as long as protergum. Legs testaceous with dorsal surface (save basal part of femora) brownish, clothed with short pale hairs, longer beneath on femora. Length of hind femora, 0.43 mm.; tibiae, 0.53 mm. Femora only slightly thickened; hind femora unarmed. In both middle and hind legs, the first segment faintly longer than second.

Abdomen: Length, 0.78 mm.; width at base, 0.55 mm. Connexiva slightly wider in female, turned in apically. Male with venter unarmed; first genital segment beneath short and smooth at base, broadly and roundly excavated behind; second genital segment retracted and not exposed. Winged form unknown.

Type (male), *allotype* (female) and 2 paratypes, Mexico City, D. F., Mexico, July 30, 1950, C. J. Drake.

Readily separated from other small species by the testaceous color, concave posterior margins of pro- and mesotergum. It is much shorter than *M. rufescens* Champion, and has differently formed protergum.

Microvelia recifana, sp. new

Apterous form: Small, brown with a pale quadrate spot in each side of the two basal tergites and a median spot on last two tergites; many large dark pits on dorsal and lateral surfaces of protergum, also two pits near base of head; a streak on front of head and sutures narrowly between abdominal segments blackish. Abdomen beneath blackish with prosternum, acetabula, apical part of venter and lower surface of genital segments testaceous, dorsal surface of the latter dark fuscous.

Size: Length, 1.80 mm.; width (base of abdomen), 0.75 mm.

Head: Width across eyes, 0.51 mm. Head strongly convex above, the median impressed line more prominent anteriorly in dark frontal streak. Antennae slender, shortly pilose, brown with ultimate segment dark fuscous; I quite stout; II distinctly enlarged distally; III slenderest; IV very long, slightly thicker than third formula—I, 16; II, 12; III, 17; IV, 30.

Thorax: Protergum large, covering almost all of mesotergum, with four transverse rows of large deep pits, also pits on its lateral sides, hind margin slowly broadly rounded, twice as wide as long (51:25). Legs testaceous with dorsal surface of femora beyond the middle and tibiae, and all of tarsi fuscous. Femora unarmed, middle femora feebly slenderer than other pairs. First tarsal of middle legs distinctly shorter than second; first only slightly shorter than second in hind legs.

Abdomen: Length, 1.25 mm. Abdomen moderately clothed with long brown hairs as well as more numerous short hairs; hairs on outside of connexiva as long as on tergites. Thorax with hairs on dorsal surface not as numerous as on tergites, more numerous on lateral sides. Connexiva convex on dorsal edge. Venter unarmed. Last venter of male

quite long, feebly convex behind; genital segments brownish beneath, dark fuscous above; first genital segment beneath smooth at base, very widely roundly excavated behind. Apteroous female and winged forms unknown.

Type (apteroous male), Recife, Bras., Aug., 1946.

This species may be distinguished from other small species of the genus by its color, hairy vesture and large, deep, pronotal pits. The protergum dorsally covers the rest of thorax, and is without a transverse frontal band.

Microvelia lujanana, sp. new

Macropterous form: Small, moderately broad, dark fuscous-brown with the broad stripe on each side of median line of head and transverse pronotal stripe fairly distinct to evanescent. Hemelytra dark brown, without markings, sometimes faintly pale basally; veins feebly raised. Legs testaceous with tips of femora above, entire dorsal surface of tibiae and tarsi brown. Body beneath brown-fuscous with bluish lustre, sometimes venter brownish apically. Connexiva concolorous with pronotum.

Size: Length, 1.50-1.70 mm.; width, 0.62-0.70 mm.

Head: Width across eyes, 0.40 mm. Median impressed line not prominent; silvery pubescence on each side next to eyes. Antennae rather stout, shortly pilose, brown with base segment largely testaceous; segment I stout; II enlarged distally; III slenderest; IV, stouter than three; formula—I, 11; II, 7; III, 11; V, 17.

Thorax: Protergum distinctly longer than wide (50:42), median line feebly (or not) distinct; humeral angles feebly raised. Legs moderately stout, testaceous, largely brownish above; femora slightly thickened, unarmed; tarsal segment two of both middle and hind legs scarcely longer than one. Length of hind femora, 0.45 mm.; tarsi, 0.48 mm.

Abdomen: Length, 0.85 mm. Clothed with short pale pubescence, without markings. Hemelytra without long hairs on basal extero-lateral margins, not covering all of concolorous connexiva. Last venter longer in both male and female than preceding segment. Genital segments of male pale beneath; first segment beneath smooth, convex, the apex deeply, broadly, roundly excavated; second segment mostly inserted. Apterous form is unknown.

Type (male), *allotype* (female) and 26 paratypes, Lujan, Buenos Aires, Arg., Dec. 18, 1938, C. J. Drake. The uniform color without pronotal markings, plain hemelytra, concolorous connexiva and antennal formula distinguish this insect from closely allied species. It is longer than *M. summersi* (D. & H.), and lacks the transverse orange-flavous band found in both *M. summersi* and *M. venustatis* D. & H.

Microvelia limaiana, sp. new

Apterous form: Small, rufo-brown with whitish frost on sides of pro- and mesotergum, and bluish patches on first two and last three abdominal tergites. Pubescence very short, golden, not conspicuous; long hairs on sides of body dark brown. Antennae dark fuscous-brown with basal segment largely testaceous.

Size: Length, 1.82-2.00 mm.; width, 0.65 mm.

Head: Width across eyes, 0.56 mm. Blackish with a broad brown stripe on each side of impressed median line. Antennae dark fuscous-brown with basal segment largely testaceous. Shortly pilose with a few scattered longer bristly hairs; segment IV thickest a little before the middle, strongly tapering apically; formula—I, 20; II, 16; III, 23; IV, 24.

Thorax: Protergum very large, covering all the rest of dorsal part of thorax, distinctly wider than long (58:32). Rufo-brown with the transverse flavous band quite frosty and extending laterally as far as middle of eyes; median pale stripe sometimes becoming obsolete posteriorly. Legs dark brown-fuscous, with coxae, trochanters and entire surface beneath of both femora and tibiae testaceous; tarsi entirely dark; pale hairs a little longer on lower surface of femora; all tibiae with rather long brown hairs on outer surface. Femora unarmed, only a little incrassate, the middle pair a little thinner than others; tarsal segments of both middle and hind legs practically subequal in length. Fore femora largely testaceous.

Abdomen: Length, 0.60 mm. Connexiva in female rather wide and strongly turned in apically in female so that the outer margins touch a little before the apex, beset with some long brown hairs at the base; entire abdomen apically strongly narrowed and turned up; bluish patches on some tergites in both sexes. Venter unarmed in male, last ventrite only a little longer than preceding segment; first genital segment beneath short and smooth at base, broadly and roundly excavated behind; second segment dark fuscous, largely inserted.

Macropterous form: Length, 2.25 mm.; width, 1.00 mm. Protergum large, wider than long (80:65); blackish rufo-fuscous, paler in front, with a prominent pale median, longitudinal flavous stripe; a large frosty patch on each side in front as in apterous form; pubescence very short, golden; humeral angles moderately prominent. Hemelytra blackish fuscous with the large triangular basal area clothed with long erect dark brown hairs, with hairs on outer margin a little longer, the veins not prominent.

Type (apterous male), *allotype* (apterous female) and 104 paratypes, Nova Teutonia, St. Catarina, Bras., May 10, 1950, Fritz Plaumann. Named in honor of Dr. A. Da Costa Lima, the noted Brazilian Entomologist, who has written many books and hundreds of scientific articles on the insect fauna of Brasil. One paratype was also collected at Barro Colorado, Canal Zone, Panama, Feb. 6-8, 1950, C. J. Drake.

Very different from known Brazilian water-striders, and separated by its much paler color, shorter long hairs on outer surface of tibiae, strongly reflexed connexiva and upturned apical part of abdomen in apterous female, and the hairy basal part of hemelytra in both sexes.

PROCEEDINGS
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A NEW WHITE-WINGED DOVE FROM GUATEMALA

BY GEORGE B. SAUNDERS

Observations in the field in Guatemala and a review of specimens of white-winged doves taken in that country convince me that the highland form which breeds in the temperate zone of the Departments of Chimaltenango and Sololá is decidedly different in habits and appearance from those present in the arid tropical zone. Heretofore all of these whitewings have been considered to be *Zenaida asiatica asiatica*, but the highland form is herewith described and named:

Zenaida asiatica alticola, subsp. nov.

Guatemalan Highland White-winged Dove

Characters.—Nearest to *Zenaida asiatica mearnsi* in dimensions, but with wings and tail averaging longer. In coloration, the back is a darker brown, usually from Chestnut Brown* to Mummy Brown or Sepia. The breast also averages darker, usually being Snuff Brown, but in a few specimens is lighter, nearer Tawny Olive. The darker coloration usually extends farther down on the belly than in *mearnsi*.

In comparison with *asiatica*, *alticola* has much longer wings and tail, and is darker on the back than most specimens of *asiatica*.

In comparison with typical *australis* from Costa Rica, *alticola* is conspicuously larger, darker brown on the back and wings, darker and more extensively purplish on the crown, occiput and hindneck, slightly darker brown on the throat and breast, and grayer on the belly.

Description.—Type, No. 397507 U. S. National Museum (Fish and Wildlife Service Collection), adult ♂, breeding, collected near Patzún, Department of Chimaltenango, Guatemala, altitude about 6,900 feet, March 5, 1942, by George B. Saunders, original No. 1612.

Measurements.—Males.—Patzún (8 specimens), wing 164.5-173.0 (167.9), tail 116.6-129.5 (122.0), culmen 19.0-21.9 (20.2), tarsus 23.6-26.3 (25.3).

Females.—Patzún (6 specimens), wing 153.0-162.0 (156.7), tail 104.0-113.3 (109.9), culmen 18.5-20.0 (19.2), tarsus 24.0-24.8 (24.4).

Type, male, wing 173.0, tail 122.5, culmen 20.8, tarsus 25.7.

Comparative measurements of specimens of *mearnsi* from the southwestern United States, Mexico and Guatemala:

Males.—

Arizona (22 specimens), wing 156.0-170.4 (161.2), tail 106.7-123.5 (116.5), culmen 20.8-24.8 (22.4), tarsus 23.1-26.1 (25.0).

*Names of colors when capitalized are from Ridgway's "Color Standards and Color Nomenclature," 1912.

Sonora (8 specimens), wing 163.0-172.6 (166.7), tail 112.7-126.7 (122.4), culmen 20.7-23.7 (22.3), tarsus 24.8-26.2 (25.4).

Guatemala, Upper Motagua Valley (7 specimens), wing 158.2-169.9 (162.9), tail 113.3-121.0 (116.0).

Guatemala, Department of Santa Rosa, Progreso (6 specimens), wing 164.0-168.0 (165.6), tail 115.6-120.4 (117.6).

Females.—

Arizona (18 specimens), wing 148.0-161.0 (156.4), tail 103.8-113.1 (109.1), culmen 20.7-25.4 (22.0), tarsus 22.8-27.0 (24.2).

Guatemala, Department of Santa Rosa, Progreso (6 specimens), wing 154.2-164.7 (157.8), tail 104.0-110.7 (107.5).

Measurements of specimens of *asiatica* from Chiapas and Texas:

Males.—

Chiapas (1 specimen), wing 158.1, tail 112.0, culmen 20.0, tarsus 24.8.

Southern Texas (18 specimens), wing 155.2-162.0 (157.9), tail 105.3-113.0 (108.9).

Females.—

Chiapas near Tonalá (2 specimens), wing 152.0-152.5 (152.3), tail 99.7-102.0 (100.9), culmen 20.1-20.6 (20.4), tarsus 23.0-25.0 (24.0).

Southern Texas (8 specimens), wing 151.3-159.1 (155.1), tail 100.0-106.0 (104.1).

Comparative measurements of specimens of *australis* from Costa Rica:

Males.—

Tenorio, C.R. (3 specimens), wing 158.8-160.0 (159.3), tail 109.0-114.1 (111.1), culmen 17.5-20.0 (18.7), tarsus 23.8-25.0 (24.6).

Cerro Santa Maria (type locality), measurements as given by Peters (1913), (5 specimens), "wing 152-161 (157.6), tail 110-114 (111.9)".

Females.—

Cerro Santa Maria (type locality), measurements as given by Peters (1913), (3 specimens), "wing 150-156 (153.6), tail 111-113. (112)".

I am much indebted to the U.S. National Museum, U.S. Fish and Wildlife Service, Chicago Natural History Museum, American Museum of Natural History, Museum of Comparative Zoology, Carnegie Museum, University of Michigan Museum of Zoology, University of California Museum of Vertebrate Zoology, Mr. H. B. Conover, Mr. Pierce Brodkorb, and the late Dr. Max M. Peet for the use of specimens in their collections and for valuable information concerning them. Dr. J. Van Tyne and Dr. John W. Aldrich read the manuscript and gave very helpful suggestions. Their assistance is gratefully acknowledged.

Range.—This race is apparently resident throughout the year in the Altos or central highlands of Guatemala in the Departments of Chimaltenango and Sololá. It probably also occurs locally in similar mesophytic pine and oak woodlands, chiefly at altitudes of from 6,500 to 8,500 feet, in the Guatemalan Departments of Huehuetenango, El Quiché, San Marcos, Totonicapán, and Quezaltenango.

A specimen in the collection of the University of Michigan Museum of Zoology, taken near Mazapa, Department of Mariscal, State of Chiapas, Mexico, (No. 110129, male, July 14, 1941) only a few miles west of the Guatemalan frontier, is apparently referable to this form. It is very similar in coloration to the type specimen, and its measurements are: wing 169.4, tail 118.8, culmen 21.6, and tarsus 25.1. I have

not visited this locality, but information indicates that the specimen probably came from a highland pine forest on the slope of Mt. Tacaná, an environment similar to that of the Guatemalan Altos.

On the basis of this specimen it seems advisable to include in the range of *alticola* this edge of Chiapas which is a continuation geologically of the Guatemalan Altos and has similar plant and animal associations.

Remarks.—The most outstanding characteristic of this form is the early season at which it breeds. In January, when frosts were common in these high woodlands, and weeks before any of the *mearnsi* or *asiatica* at lower elevations were found nesting, *alticola* began breeding. Natives near Patzún reported catching several fledglings during the latter part of January. All of the adults collected in that vicinity during March 1942 had been breeding for several weeks. Juveniles approximately four weeks old were seen there on March 5.

This early breeding, their occupation of high pine and oak woodlands, their larger size, and darker coloration distinguish them from the *mearnsi* and *asiatica* found at lower elevations.

I have studied this species in the field in the United States, Mexico, Guatemala and El Salvador, and examined specimens from its entire range. Of all the various subspecies of *Zenaida asiatica* I have observed, *alticola* is most strikingly and distinctively characterized by its habits and habitat.

In the high pine and oak woodlands on the rugged hill and mountain slopes of the Altos above Sololá, at an altitude of 7,500 feet where on the morning of March 5, 1942 we awakened to find ice on our sleeping bags, *alticola* males were singing their territorial songs and feeding fledglings hatched in February. Below, at altitudes of from 500 to 5,000 feet, pairs of *mearnsi* were only then entering the breeding cycle, although their habitat in the arid tropical and subtropical woodlands of the interior with its hot weather should have been more conducive, one would think, to earlier nesting than the cool environment of the highlands.

Even farther below on the sweltering slopes of the Pacific littoral, and especially eastward in the tropical valleys of the Lempa and San Miguel rivers, El Salvador, where the thermometer was well above 100° at midday, there were large flocks of *asiatica* feeding in the fields and open woodland. Their bodies were heavy with winter fat and their gonads small. Most of these were migrants from the north. There in the lowlands several *asiatica* banded as nestlings in the Rio Grande delta of Texas had been shot in late autumn, winter and spring by local hunters. As the latter part of March arrived, flocks of these individuals from eastern Mexico and southern Texas began the flight northward. They first went toward the west and northwest as far as the Isthmus of Tehuantepec, then along the Gulf littoral of eastern Mexico to their breeding grounds.

The taxonomy of white-winged doves in southern Mexico and Central America is complicated greatly by the presence of so many migrant *asiatica* during late autumn, winter and spring. By far the majority of specimens in museum collections have been collected then and are of no value in determining the identity of the breeding form or forms.

No wonder *asiatica* has been thought to be the resident race throughout Central America. Not until several of the more than 3,000 whitewings we banded in southern Texas were taken by hunters in El Salvador and Guatemala in 1940, was it realized that *asiatica* from the United States journeyed so far southward.

Extensive collecting has proved that *mearnsi* is the most common and widely distributed breeding form in Guatemala. It is resident in the dry tropical and subtropical woodlands of the lower mountain slopes and in the arid interior valleys and plains, usually above 500 feet in altitude.

The race *alticola* is present locally in the central highlands, chiefly above 6,500 feet.

The race *asiatica* occurs locally as a breeder in the low tropical woodlands near the Caribbean and Pacific coasts. All specimens collected in March, and some in April were non-breeders and probably migrants as was proved by their fatness and small gonads. But records for late April in the lowlands of the Departments of Escuintla, Jutiapa and Santa Rosa included some breeders. During the winter months migrant *asiatica* are present in many parts of the Republic, including the interior valleys and mountains as well as on both coastal plains.

Summary.—The new race of white-winged dove, *Zenaida asiatica alticola*, described herein, is resident in the central highlands of Guatemala in temperate zone pine and oak forests, chiefly above 6,500 feet in altitude. It is distinguished by its large size, especially its long wings and tail, as well as by its rich, dark coloration. In spite of its higher, colder habitat, this form breeds earlier in the year than any race of white-winged dove yet studied in detail. Thus its ecological distribution, breeding habits, coloration and size all set it apart from other known races of this species.

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PROCEEDINGS
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A NEW GECKO OF THE GENUS *GYMNODACTYLUS* FROM
SERPENT ISLAND

BY ARTHUR LOVERIDGE

It is to Mr. J. Vinson, well known for his active interest in the fauna of Mauritius, that the museum is indebted for his having submitted the interesting lizard described below.

Serpent Island is fully as difficult of access as its near neighbor Round Island, long famous in herpetological circles for the monotypic genera of boas (*Bolieria* and *Casarea*) and other reptiles peculiar to it. These provide ample evidence of its long isolation. Owing to the turbulent seas by which they are surrounded, a landing on these islands is only possible during short intervals of calm weather which occur usually in November. Messrs Barnwell and Booker are to be congratulated in taking advantage of this opportunity to secure a new member of the ancient genus *Gymnodactylus*, which I propose calling:

Gymnodactylus serpensinsula sp. nov.

Holotype: Museum of Comparative Zoology, No. 51,550, a gravid ♀ from Serpent Island off the northeast coast of Mauritius. Collected by Messrs P. J. Barnwell and A. G. Booker, on November 24, 1948.

Diagnosis: Small, striated, subconical tubercles disposed in longitudinal series among the irregularly-sized, juxtaposed, dorsal granules which apparently average slightly smaller than the keeled ventrals; a slight fold from axilla to groin; claws strong.

Most nearly related to *G. rubidus* (Blyth) of the Andaman Islands, with which it has been compared, and from which it differs in possessing keeled ventrals and in other ways. The new species also shows affinities with *G. marmoratus* (Gray, 1831) of Java.

Description: Head moderately large; forehead concave, steeply sloping towards snout; snout bluntly rounded, twice as long as the orbital diameter, which is two-thirds its distance from the ear-opening and three times the vertical diameter of the ear-opening; ear-opening vertical, subtriangular; rostral twice as broad as high, with median cleft above; granules on snout convex, keeled, slightly larger than those in center of occiput; nostril between rostral, first labial, and 3 nasals of which the uppermost is separated from its fellow by 1 granule; upper labials 9-10; lower labials 8; mental about as long as broad; a pair of large postmentals followed by the very small granular scales which merge into those covering the throat and are separated from the anterior lower labials by a series of enlarged scales.

Back and limbs covered above with small, unequal, usually smooth, juxtaposed granular scales intermixed with small, striated, subconical

tubercles arranged in 14, more or less regular, longitudinal series; lateral scales subequal to the keeled ventrals, which are slightly larger than the dorsals; limbs long, the adpressed hind limb reaching the axilla; 11 well-defined lamellae and scansors under the first toe, 18 under the fourth; base of tail (unfortunately the rest is regenerated) covered with irregular, smooth scales and scattered tubercles above; below, at base, with irregular imbricate scales; on either side slightly posterior to the anus is a row of 4 enlarged scales.

Color: Above, pale sandy buff to gray conspicuously blotched with black or brown; each labial with a blackish spot. Below, body and limbs white, immaculate; regenerated tail grayish brown. The general resemblance in body pattern to that of *G. rubidus* makes it appear probable that an unregenerated tail would be banded above with black and white.

Size: Total length of adult ♀ holotype, 105⁺ (60 + 45⁺) mm., as tail regenerating.

Breeding: Eggs ready for deposition in late November.

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FISHES OF THE TRIBUTARIES OF THE ANACOSTIA RIVER,
MARYLAND

BY HENRY F. HOWDEN¹ and ROMEO MANSUETI

A survey of the fish fauna of the tributaries of the Anacostia River system in Maryland was carried out during the fall of 1948 and continued through the summer of 1949. The investigation of the eight major tributaries was begun to determine the fish fauna since the work of Smith and Bean (1899). Truitt, Bean, and Fowler (1929) record many species from Prince Georges and Montgomery Counties, but they specify no particular streams.

We would like to express our sincere appreciation to Dr. Robert A. Littleford, of the Department of Zoology, University of Maryland, for suggesting the problem, guiding us, and providing facilities and equipment. Thanks especially must be extended to Dr. Edward C. Raney, of Cornell University, and to Dr. Ernest A. Lachner, of the United States National Museum, for aid in checking fish identifications. Mr. Byrd Dozier was an able field assistant.

The Anacostia River Drainage System covers parts of Prince Georges and Montgomery Counties, Maryland, and comprises an area of about 93 square miles. The tributaries flow in a general north to south direction, bounded on the north and east by the Patuxent River Drainage, and on the west by the Rock Creek Drainage. The Anacostia ultimately flows into the Potomac River near the southern boundary of Washington, D. C.

Twenty-five stations were established along the tributaries and each was visited at least three times. Six of these stations were situated above the Fall Line. For the most part the streams in the Coastal Plain were sluggish, averaging twenty feet in width and one to two feet in depth, with a rate of flow of about two feet per second. Except for the head-water stations, there was a noticeable amount of silt in all of the streams. In the vicinity of the more heavily populated areas, such as College Park, and Hyattsville, sewage was plainly evident.

Collections of fish were made by seining with 25 foot and 15 foot, $\frac{1}{4}$ inch mesh seines. The fish were deposited in formalin in the field and later sorted in the laboratory for identification.

¹The work was accomplished by the Senior author in partial fulfillment for a Master of Science Degree at the Department of Zoology, University of Maryland.

At each station physical data, such as width, depth, rate of flow, gradient, air and water temperature were taken. The water temperature did not fluctuate more than 7° F. from the air temperature at any time, and did not become sufficiently cold to warrant the inclusion of cold-water fish, such as trout.

Chemical data included: hydrogen ion concentration, conductivity, and amount of dissolved oxygen in the water. The pH varied from 6.3 to 7.2, while the oxygen varied from 2 cc to 7.3 cc per liter. None of the chemical or physical factors studied seemed to exclude completely or aid in the distribution of the population of fishes.

The following specimens were recorded and deposited in the collection of the Department of Zoology of the University of Maryland.

1. *Entosphenus lamottenii* (LeSueur).—American Brook Lamprey. Specimens were collected on sandy-bottomed streams at three widely separated stations.
2. *Pomolobus pseudoharengus* (Wilson).—Alewife. One dead specimen was recovered at Riverdale, March 29, 1949. Reports of many more specimens being fished were gathered at College Park.
3. *Catostomus commersonnii commersonnii* (Lacepede).—Common White Sucker. This species was collected at almost every station in various stages of growth or size.
4. *Hypentelium nigricans* (LeSueur).—Hog Sucker. A number of juveniles were collected during the summer in the headwaters of various tributaries.
5. *Erimyzon oblongus oblongus* (Mitchill).—Eastern Creek Chubsucker. A single specimen was taken in the muddy backwater of Indian Creek.
6. *Cyprinus carpio* Linneaus—Carp. Carp were particularly common in the muddy backwaters of Northeast and Paint Branch.
7. *Semotilus corporalis* (Mitchill).—Fallfish. This species was widely distributed at almost half of the stations, the majority of the specimens taken being juvenile.
8. *Semotilus atromaculatus atromaculatus* (Mitchill).—Northern Creek Chub. Relatively common in the clear upper waters of several of the tributaries.
9. *Rhinichthys atratulus atratulus* (Hermann).—Eastern Blacknose Dace. The dace were numerous at almost all of the stations in moderately moving currents.
10. *Exoglossum maxillingua* (LeSueur).—Cutlips. Commonly distributed in the tributaries of Northeast Branch.
11. *Clinostomus vandoisulus* (Cuvier and Valenciennes). Red-sided Dace. Present in headwaters of the various tributaries in large numbers, especially in deep pools in winter.
12. *Notemigonus crysoleucas crysoleucas* (Mitchill).—Eastern Golden Shiner. Present mainly in lower sluggish tributaries, where they were extremely abundant.
13. *Notropis rubellus* (Agassiz).—Rosyface Shiner. This species was present mainly in the lower reaches of Northwest Branch.

14. *Notropis cornutus cornutus* (Mitchill).—Eastern Common Shiner. Over 450 specimens were collected under a wide variety of conditions, being present at almost every station.
15. *Notropis hudsonius amarus* (Girard).—Eastern Spottail Shiner. Specimens were collected in moderate numbers in sluggish pools of the lower portions of the tributaries.
16. *Notropis analostanus* (Girard). Satinfish Shiner. This species was widely distributed, over 500 specimens being collected.
17. *Notropis procne procne* (Cope).—Northern Swallowtail Shiner. This species was associated with the preceding species in large numbers and was taken at almost every station.
18. *Hybognathus nuchalis regius* (Girard).—Eastern Silvery Minnow. This species was occasionally observed in quiet, turbid waters in the lower portions of the tributary waters.
19. *Ameiurus nebulosus nebulosus* (LeSueur).—Northern Brown Bullhead. Taken occasionally in lower tributaries.
20. *Schilbeodes marginatus marginatus* (Baird).—Common Eastern Madtom. Found only in upper headwaters of Northwest Branch.
21. *Schilbeodes mollis* (Hermann).—Tadpole Madtom. Recorded by Bean and Weed (1911) in Little Beaver Dam Branch, Anacostia River.
22. *Umbra pygmaea* (DeKay).—Eastern Mud Minnow. Found only in the quiescent pools of Northwest Branch among growths of aquatic vegetation. This species was usually associated with *Esox niger*.
23. *Esox niger* (LeSueur).—Chain Pickerel. Found in quiet pools among luxuriant growth of aquatic vegetation.
24. *Anguilla bostoniensis* (LeSueur).—American Eel. Taken occasionally in a variety of habitats in the lower portions of the tributaries.
25. *Fundulus heteroclitus macrolepidotus* (Walbaum).—Mummichog. Numerous at the junction of the Northeast and Northwest Branches.
26. *Gambusia affinis holbrooki* (Girard).—Eastern Mosquitofish. A single specimen was taken near the bridge of the East-West highway in the Northwest Branch.
27. *Boleosoma nigrum olmstedii* (Storer).—Tessellated Johnny Darter. Widely distributed at almost all stations having a sandy bottom and moderate current.
28. *Ioa vitrea* (Cope).—Glassy Darter. Fowler (1945) records two specimens from Northwest Branch, Anacostia River, Hyattsville, Maryland, exchange from the U. S. National Museum.
29. *Pomoxis nigro-maculatus* (LeSueur).—Black Crappie. Several specimens were taken at Northeast Branch at Riverdale Road.
30. *Lepomis cyanellus* (Rafinesque).—Green Sunfish. Widely distributed in rocky situations, although not numerous.
31. *Lepomis gibbosus* (Linnaeus).—Pumpkinseed. Taken only at Branchville in Indian Creek in quiet turbid pools of water.
32. *Lepomis macrochirus macrochirus* (Rafinesque).—Common Bluegill. Taken in the more sluggish tributaries of Northeast Branch.

33. *Lepomis auritus* (Linnaeus). Yellowbelly Sunfish.

A single specimen was taken in a small pool in Northeast Branch at Riverdale.

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PROCEEDINGS
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**A NEW SNAKE (TANTILLA) FROM THE ISTHMUS OF
TEHUANTEPEC, MEXICO**

BY HOBART M. SMITH* AND PHILIP W. SMITH**

A fine series of reptiles secured by Mr. Thomas MacDougall in 1949 on the Pacific slopes of the Isthmus of Tehuantepec, Oaxaca, Mexico, contains a single specimen of an undescribed and unnamed species of *Tantilla* which may be known as:

***Tantilla triseriata* new species**

Holotype. Univ. Ill. Mus. Nat. Hist., No. 20198, a female from Coatlán, Oaxaca, collected October 9, 1949, by Thomas MacDougall.

Diagnosis. A three-lined, light-collared *Tantilla* with 163 ventrals, 61 subcaudals, prefrontals twice as long as internasals, and relatively extensive markings on lower jaw (including a pair of comma-shaped brown marks on the third and fourth infralabials). Allied to *T. taeniata* Bocourt of Guatemala, differing in higher ventral count; common prefrontal suture longer than distance of prefrontals from tip of snout; prefrontal and second supralabial broadly in contact; brown head cap more sharply defined and more extensive, reaching all except two small areas of upper lip and extending onto mental and anterior infralabials; no light marks on prefrontals; and nuchal collar slightly more cranial in position, its posterior border a minimum of one scale length behind posterior extremity of parietals, anterior border equally far from rear edge of parietals.

Description of holotype. Frontal hexagonal, length exceeding distance from tip of snout, only posterior angle acute; maximum length of prefrontals greater than their distance from tip of snout, slightly less than half maximum length of frontal, twice maximum length of prefrontals, and more than $3/4$ maximum length of supraoculars; common internasal suture one third length of common prefrontal suture; latter nearly $1\frac{1}{2}$ times as long as its distance from tip of snout; parietals deeply cleft posteriorly, cleft occupied by two scales; common parietal suture $2/3$ length of frontal; nasal large, $3/4$ as high as rostral at rostro-nasal suture, constricted at position of nostril; nasal completely divided, broadly separated from preocular by contact of distinctly elevated second supralabial and lateral extension of prefrontal; prefrontal-supralabial suture subequal to or slightly shorter than prefrontal-nasal suture; two postoculars, lower larger than upper; two subequal temporals, an anterior and posterior, both twice as long as broad; eye separated from tip of snout by slightly more than twice diameter of orbit, separated from lip by $2/3$ its diameter; seven supralabials; six infralabials, the

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scales of the anterior pair in very narrow contact medially, fourth much the largest; anterior four infralabials in contact with chinshields; posterior chinshield $2/3$ length and $3/4$ width of anterior; three pairs of scales between posterior chinshields and first ventral.

Scales in 15-15-15 rows, smooth, unpitted; ventrals 163, anal divided, subcaudals 61. Total length 203 mm., tail 45 mm.; sex female.

Top of head anterior to nuchal collar chestnut brown except for a narrow semicircular light mark bordering sutures of rostral with nasal and internasal; side of head anterior to eye brown with a distinct yellow triangular mark occupying posterior portion of nasal, first, second, and a portion of third supralabials; behind eye a large yellow spot occupying posterior half of anterior temporal, lower postocular, and most of fourth and fifth supralabials; ventral side of head light yellow and with a number of dark marks, including as the most prominent a comma-shaped area continuous with vertical dark band through eye involving third and fourth infralabials and extreme edge of posterior chinshields; anterior half of mental, nearly half of first infralabials, and posterolateral corner of second infralabial dark.

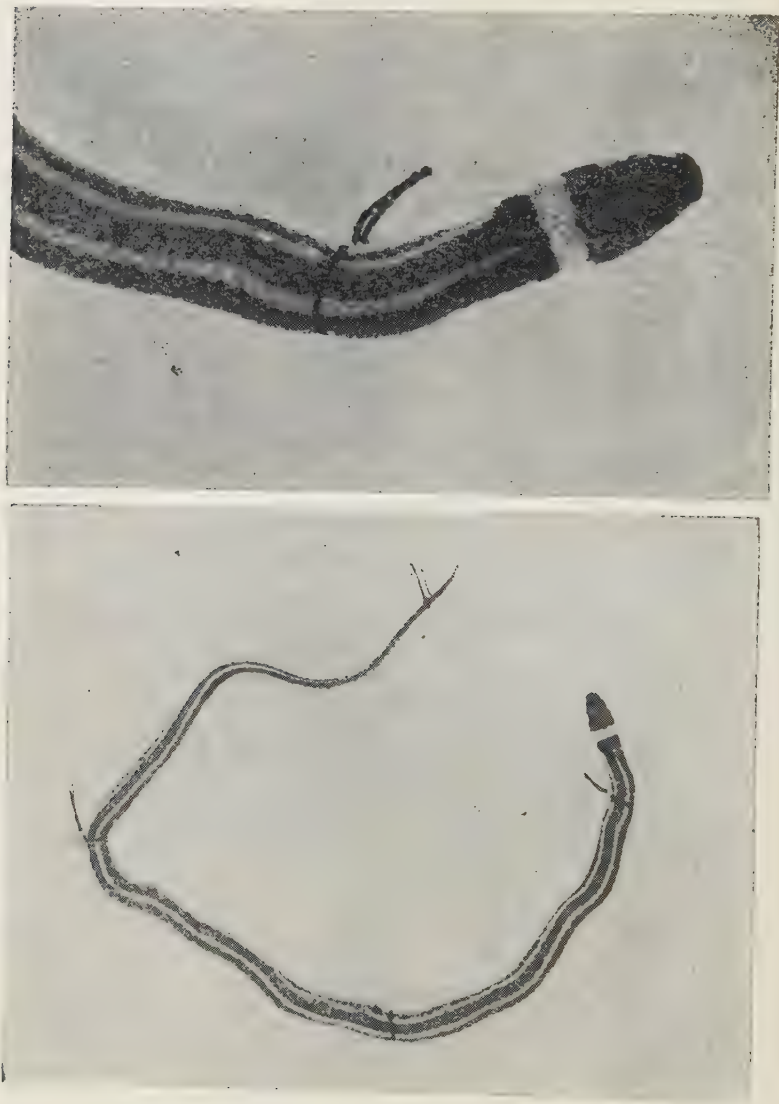
Nuchal collar two scale lengths wide dorsally, $2\frac{1}{2}$ scale lengths wide laterally; posterior border a maximum of a full scale length behind rear edge of parietal, anterior border a scale length cephalad from rear edge of parietals and passing ventrally through the secondary temporals and posterior third of seventh supralabials.

Ground color of body rich chestnut brown dorsally with three light yellow longitudinal stripes; middorsal stripe beginning $1\frac{1}{2}$ scale lengths behind nuchal collar, at which point it is one scale wide; seven scale lengths behind collar middorsal stripe widens, covering inner halves of paravertebral scale rows, continuing almost to tip of tail; lateral stripes beginning three scale lengths behind seventh supralabials, $1\frac{1}{2}$ scale lengths behind nuchal collar, occupying adjacent halves of third and fourth scale rows, continuing almost to tip of tail; light stripes on body approximately half the width of dark background; middorsal stripe, except at extreme anterior end, slightly wider than laterals; venter light yellow and unmarked; lowermost scale row of same color as venter anteriorly, ground color extending onto upper edge progressively more extensively toward anus, beginning at about level of 12th ventral and involving a maximum of $1/2$ the scale row in front of anus.

Comparisons. Of the species now known from Mexico, the ones most closely resembling *T. triseriata* are *T. jani*, *T. striata*, and *T. flavilineata*. From *T. striata* the new species differs in having higher ventral and subcaudal counts and in details of pattern. From *T. striata* and *T. flavilineata* it differs in having a higher subcaudal count and a sharp contrast between ground color and the color of the collar and longitudinal light stripes. Actually, however, *T. triseriata* appears to belong to a Central American group, not previously recorded from Mexico. Unquestionably *T. taeniata* of Guatemala is its closest relative, from which it differs by at least those features already pointed out in our diagnosis. The original description (Bocourt, Miss. Sci. Mex. Amer. Cent., Rept., livr. 9, 1883, p. 587) indicates a greater similarity than does comparison of our specimen with Bocourt's figure (*op. cit.*, livr. 10, 1886, pl. 37, figs. 3, 3a-d)

inasmuch as the most obvious differences between the species are found in the nature of the head markings and arrangement of head scales. Differences other than those here emphasized but evident upon comparison of Bocourt's illustration and our type may prove constant despite variability in other species. The remarkably large size of the prefrontals in both species is perhaps a unique group character. Inasmuch as the type is slightly desiccated we have not attempted to examine teeth.

Coatlán is located in central southern Oaxaca, west of the narrowest portion of the Isthmus of Tehuantepec. Extent of range of the species is not evident, but it would not be expected to approach that of *T. taeniata*, the closest known relative.



EXPLANATION OF PLATE

Fig. 1. *Tantilla triseriata*, type. Dorsal view of head and fore part of body.

Fig. 2. *Tantilla triseriata*, type. Dorsal view.

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A NEW LIZARD (*SCELOPORUS*) FROM OAXACA, MEXICO

BY PHILIP W. SMITH AND HOBART M. SMITH*

Specimens of *Sceloporus spinosus* recently received from extreme southern Oaxaca, Mexico, reveal that the form occurring there is a distinct and undescribed subspecies. We name it

Sceloporus spinosus apicalis new subspecies

Holotype. Univ. Ill. Mus. Nat. Hist. no. 8864, an adult male, secured 10 miles southwest of Miahuatlán, Oaxaca, Mexico, July 6, 1949, by W. L. Burger.

Paratypes. Thirty-six, as follows: Univ. Ill. Mus. Nat. Hist. nos. 8850, 8852-3, eight miles south of Miahuatlán, Oaxaca, July 24, 1949, W. L. Burger; Univ. Ill. Mus. Nat. Hist. nos. 8851, 8854-63, 8865, and Ill. Nat. Hist. Surv. no. 6520, same data as holotype; Univ. Ill. Mus. Nat. Hist. nos. 10821-30, San Pedro Quiechapa, Oaxaca, H. M. Smith; Amer. Mus. Nat. Hist. nos. 18822-6, 18721-5, Miahuatlán, Oaxaca, Paul D. R. Rüdthling.

Diagnosis. A subspecies of *Sceloporus spinosus* with the following combination of characters: usually 5-5 supraoculars, prefrontals usually in contact medially, usually less than 30 dorsal scales (80.5%), and usually less than 10 femoral pores (86%).

Description of holotype. Adult male; head scales smooth, convex except frontal and interparietal which are concave; interparietal pentagonal, its apex separating more or less rectangular frontoparietals medially; single parietal to either side of, and two-thirds size of interparietal; posterior portion of frontal slightly less than half size of anterior portion; prefrontals in contact medially; frontonasals three with laterals two-thirds the median in size, and in contact with both canthals; internasals five, irregular in arrangement and unequal in size; internasals separated from rostral by three postrostrals, median one of which is one-third size of lateral postrostrals, separated from nasals, by a ring of three much smaller scales; supraoculars five, anterior smallest, third largest, separated from median head plates by a single row of linear scales, and from superciliaries by a single row of rectangular scales; two canthals per side, separated from lorilabials; posterior canthal with a small posterior process on upper side which is involved in superciliary ridge; subnasal present, two-thirds size of more or less square loreal and slightly more than half size of preocular; one elongate, keeled subocular; two smaller keeled postoculars; lorilabials in two

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rows except anteriorly; supralabials 4-4; infralabials 5-5, slightly larger than supralabials.

Mental pentagonal, anterior edge slightly convex; three pairs of postmentals, anterior pair in contact medially; mental separated from labiomentals; infralabials separated from gulars by one complete and one incomplete row of labiomentals; anterior gulars reduced in size and entire; posterior gulars distinctly notched; auricular lobules three, median largest, lower smallest; temporal scales keeled and weakly mucronate; postauricular scales strongly mucronate and denticulate.

Dorsal scales keeled, mucronate, denticulate, increasing in size posteriorly, in 38 rows at midbody, 28 from interparietal to a point above rear margins of femora; mucrones in parallel rows; occipital scales reduced in size; lateral scales not mucronate, strongly denticulate, slightly smaller than dorsals, and in oblique rows; ventral scales notched, about $\frac{1}{2}$ size of dorsals, 38 from shoulders to anus; chest scales slightly larger than belly scales; interfemoral and preanal scales slightly smaller than belly scales; dorsal scales of legs keeled, mucronate, slightly notched; ventral leg scales not keeled, mucronate, strongly denticulate; femoral pores 7-7; lamellar formula for toes 9-14-18-20-13 (9-14-17-20-14), fingers 9-13-16-17-10 (9-14-16-17-11); proximal dorsal tail scales as large as dorsal body scales, similar, becoming more strongly keeled and smaller distally; ventral tail scales notched, smooth proximally, becoming keeled and mucronate distally; snout-vent length 90 mm., tail length 137 mm.

Dorsum very dark with ill defined dorsolateral light stripes about two scales wide, comprised of light, green-centered scales; no transverse dark bars or blotches; upper surface of tail black; chin except gray mental and postmentals blue, each scale with narrow outer margin of white; ventral scales between blue belly patches and gular fold region light green, mottled with dark gray; belly patches separated medially by four scale widths at narrowest point (midway between axilla and groin); blue on anterior surface of thighs gradually becoming black; underside of legs gray green with minute dark mottling; underside of tail light gray proximally, becoming darker distally.

Variation. The paratypes exhibit the following variation. The number of femoral pores in 36 specimens varies from 7 to 11, average 8.2 (7-8, four; 8-8, twelve; 8-9, nine; 9-9, five; 9-10, one; 10-11, one; 11-11, two). The number of dorsal scales varies from 27 to 33, average 28.5 (27, thirteen; 28, eight; 29, eight; 30, three; 32, three, 33, one). The number of supraoculars is available for 35 specimens as follows: 4-4, two; 4-5, three; 5-5, twenty-nine; 5-6, one. The condition of the prefrontals in 25 specimens is also variable; the scales are in contact medially in 22 specimens, separated by an azygous scale in three. The number of ventral scales between the anus and anterior border of the shoulders in 15 specimens varies from 36 to 47, average 40.2 (36, one; 37, one; 40, two; 42, three; 43, two; 44, two; 45, two; 46, one; 47, one).

Distinctness of dorsal pattern varies from an almost black ground color with indistinct dorsolateral light stripes to a gray green ground color with more or less distinct light greenish dorsolateral stripes, slightly less than two scales in width. The latter condition is found chiefly in the females. Some females and sub-adults of both sexes usually have six

to seven transverse black bands, about a scale length in width, which are interrupted middorsally and dorsolaterally by the longitudinal light stripes. Chins of females and juvenile males are uniform gray green or gray with longitudinal dark stripes. Ventrals of females are immaculate or irregularly marked with dark lines or dots, usually with a midventral dark line. Adult males have blue black chins, blue belly patches, a heavy midventral dark stripe, and the entire venter is suffused with black.

Comparisons. The adjacent race of *S. spinosus* is *S. s. caeruleopunctatus*, which inhabits the area immediately to the north of that occupied by *S. s. apicalis* and differs most markedly in possessing more numerous dorsals (28 to 37, 91% with 31 or more), and more numerous femoral pores (8 to 14, 87% with 10 or more); a difference in pattern may well exist, for the new form shows no evidence of the two rows of dark blue spots between the dorsolateral light lines as is so characteristic of *S. s. caeruleopunctatus*.

Actually the race most closely duplicating the new form is *S. s. spinosus*, in spite of the separation of the ranges of the two forms by that of *S. s. caeruleopunctatus*. The only features we have observed to differ between *S. s. apicalis* and *S. s. spinosus* is number of supraoculars (4 in 78% of *S. s. spinosus*, 7% of *S. s. apicalis*; and contact (88% of *S. s. apicalis*) or separation (88% of *S. s. spinosus*) of the prefrontal scales. The latter character is highly variable in *S. s. caeruleopunctatus*.

Remarks. Intergradation between *S. s. caeruleopunctatus* and *S. s. apicalis* probably occurs between Ejutla and Miahuatlán. Specimens from a short distance to the north of Ejutla (near Ocotlán) are apparently typical of the more northern race, whereas those from an approximately equal distance to the south near Miahuatlán are of course *S. s. apicalis*. Incomplete data on two specimens in the American Museum (nos. 18598-9) from "Miahuatlán to Ejutla" are, however, more or less typical for the more northern race (dorsals 33, 32; supraoculars 5-5 in each; femoral pores 10-11, 12-12); the specimens presumably were taken nearer the biotic area including Ejutla than that encompassing Miahuatlán.

At least one character is unique for each of the three races of *S. spinosus*. In virtually all respects the central race, *S. s. caeruleopunctatus*, is more primitive than the two peripheral forms, which may well be regarded as somewhat parallel derivatives of a common ancestor similar to the present central race.

No difference in habits or habitat between the three races of *S. spinosus* are now apparent. Field notes record that Burger's specimens were taken "in brush" and on "open rocky hillsides."

The zoogeography of southern Oaxaca is obviously inadequately known. The race here described is apparently restricted to the ranges of mountains south of the Tehuantepec River and east of the Río Verde. A growing body of evidence points toward the existence in this region of a degree of endemism, at least at high elevations, that merits zoogeographic recognition.

PROCEEDINGS
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TWO NEW MAMMALS FROM CENTRAL MEXICO

BY WALTER W. DALQUEST

Louisiana State University Museum of Zoology, Baton Rouge, La.

While working on a synopsis of the North American bats of the genus *Pipistrellus* (Hall and Dalquest, Univ. Kansas Publ. Mus. Nat. Hist., vol. 1, no. 26, 1950), I was impressed by the paucity of Canyon Bats, *Pipistrellus hesperus*, from the plateau of central Mexico. Indeed, there seems to be but a single record of this species from central Mexico, and this locality, in Jalisco, is several hundred miles south of the remainder of the known range of the species. Consequently, when I found Canyon Bats in the state of San Luis Potosí in the summer and fall of 1950, a fairly large series was collected.

I expected that these specimens would be referable to *Pipistrellus hesperus australis* Miller, described from Barranca Ibarra, Jalisco, in 1897, on the basis of four specimens in alcohol. Comparison with three of these four specimens of *australis* shows, however, that the bats from San Luis Potosí are distinct. According to Miller (N. Amer. Fauna 13, p. 90, 1897), the forearm of the type of *australis* measured 29 millimeters. In the three topotypes examined by me, the forearms measured 28.3, 28.5, and 29.3 millimeters. The smallest *Pipistrellus* from San Luis Potosí has a forearm 29.6 millimeters in length, and in other features also, the specimens from San Luis Potosí are all larger than the bats from Jalisco.

The color of *Pipistrellus hesperus australis* is not known, but Miller (*loc. cit.*) judged, from the comparison of the topotypes with other alcoholic specimens, that *australis* is darker than *Pipistrellus hesperus hesperus* (Allen). Hatfield (Journ. Mamm., vol. 17, p. 260, 1936), thought that Canyon Bats from Sonora and Lower California belonged to the same race as the bats from Jalisco, and these he described as "Dorsally between cinnamon drab and drab. . ." The Canyon Bats from San Luis Potosí are darker than this.

The Canyon Bats from San Luis Potosí seem to belong to an unnamed race, and may be known as:

***Pipistrellus hesperus potosinus* new subspecies**

Type.—Adult male, skin and skull number 4019, Louisiana State University Museum of Zoology; obtained at Presa de Guadalupe, San Luis Potosí, México, by Walter W. Dalquest on July 24, 1950; original number 14318.

Range.—Known only from the western and central parts of the state

of San Luis Potosí, México, but probably ranging over the eastern part of the Mexican Plateau.

Diagnosis.—Size large for a Canyon Bat, only slightly smaller than the largest known races of the species; color dark, varying from Drab to Sepia (Ridgway, *Color Standards and Color Nomenclature*, Washington, D. C., 1912) and averaging darker than the darkest known races of the species.

Comparison.—*Pipistrellus hesperus potosinus* is larger and darker than *Pipistrellus h. australis* and all described races of *Pipistrellus hesperus* save *P. h. maximus* and *P. h. santarosae*. From these latter two races, *potosinus* may be distinguished by its much darker color. A single individual *potosinus* is much paler than the rest of the series, and this specimen is as dark as the darkest *santarosae* and darker than the darkest *maximus* examined.

Measurements.—The arithmetic means, with extremes in parentheses, for 12 males and 10 females, are, respectively: total length, 74 (71-77); 80 (77-85); length of tail, 31 (30-33), 33 (32-35); length of foot, 6 (5-6), 5 (5-5); height of ear from notch, 13 (13-14), 14 (13-14); height of tragus, 5 (5-5), 5 (5-5); length of forearm, 30.8 (29.6-31.8), 32.3 (30.5-33.5); greatest length of skull, 12.7 (11.7-12.8), 12.9 (12.3-13.6); condylobasal length, 12.2 (11.7-12.8), 12.3 (12.0-12.9); zygomatic breadth, 7.8 (7.5-8.2), 8.0 (7.9-8.4); braincase breadth, 6.5 (6.2-6.7), 6.5 (6.1-6.8).

Specimens examined.—Total number 27, all from San Luis Potosí, México, as follows: City of San Luis Potosí, 6; San Luis Potosí Reservoir, 6; Presa de Guadalupe, 12; Hacienda Capulín, 3.

When Howell (N. Amer. Fauna 56, 1938) revised the ground squirrels of North America, he had no specimens of *Citellus spilosoma* from the central and eastern parts of the state of San Luis Potosí. Recently collected specimens show that this area is inhabited by a well-marked but unnamed race, which intergrades with the richly colored *Citellus spilosoma spilosoma* (Bennett) on the west and with the pale *C. s. pallescens* Howell on the north. The new race is named in honor of Mr. Ernesto Carbrera Ipiña of the city of San Luis Potosí, and may be known as:

***Citellus spilosoma cabrerai* new subspecies**

Type.—Adult female, skin and skull number 4131, Louisiana State University Museum of Zoology; obtained at 10 kilometers north-north-east of Nuñez, San Luis Potosí, México by Walter W. Dalquest on July 5, 1950; original number 14102.

Range.—Desert areas of central and eastern San Luis Potosí and probably adjacent parts of the states of Guanajuato and Tamaulipas, México.

Comparisons.—*Citellus spilosoma cabrerai* is slightly smaller than *Citellus s. spilosoma*, has a smaller, narrower skull, and is much darker and less reddish in color. Compared with *C. s. pallescens*, *cabrerai* is similar in size and cranial features, but is darker and duller, less brown, in color. The spots on the dorsal area of *C. s. cabrerai* are more obscure than those of either of the two neighboring races.

Measurements.—The measurements of an adult male and the arithmetic means for the measurements of two adult females are, respec-

tively: total length, 249, 245; length of tail 80, 78; length of hind foot, 34, 34; height of ear from notch, 9, 10; greatest length of skull, 40.5, 40.6; condylobasal length, 35.9, 36.3; palatilar length, 18.0, 18.4; zygomatic breadth, 23.0, 23.8; cranial breadth, 19.0, 19.2; interorbital breadth, 9.1, 9.0; post-orbital constriction, 14.0, 14.6; length of maxillary tooth row, 7.1, 7.9.

Remarks.—The greater part of the desert of the state of San Luis Potosí is occupied by this race of *Citellus spilosoma*. *Citellus spilosoma spilosoma* occurs in western San Luis Potosí, west of the city of San Luis Potosí. Intergradation takes place at Arriaga, Tepetate, the city of San Luis Potosí, and at Hacienda la Parada. Specimens from the latter two localities were referred by Howell (*loc. cit.*, p. 125) to *Citellus s. pallescens*. The geographic range of *C. s. pallescens* lies mainly to the north of the state of San Luis Potosí, and only specimens from the extreme northern tip of the state are referable to *pallescens*.

Specimens examined.—Total number 6, all from San Luis Potosí, México, as follows: Esperanza, 1; 10 km. NNE Nuñez, 1; 6 km. SSW Nuñez, 1; 6 km. S. Matehuala, 2.

I am indebted to Hartley H. T. Jackson and Stanely P. Young of the Fish and Wildlife Service, and David H. Johnson and Henry W. Setzer of the United States National Museum, for the loan of comparative material of *Pipistrellus hesperus* and *Citellus spilosoma*.

PROCEEDINGS
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THE WATER SHREWS OF THE LABRADOR PENINSULA*

BY DAVID H. JOHNSON

U. S. National Museum

The American water shrews of the species *Sorex palustris* are rare in collections of mammals from the Labrador Peninsula, which includes Labrador proper and the part of Quebec that lies between Hudson Bay and the Gulf of St. Lawrence. Including those newly recorded here, I know of 10 specimens from seven different localities in this entire area of about 175,000 square miles. They are scattered in four collections, and the six specimens that have received previous notice have been variously assigned to the subspecies *albibarbis*, *gloveralleni*, and *labradorensis*. Specimens in the collection of the Carnegie Museum, Pittsburgh, have been loaned for study through the courtesy of J. Kenneth Doult, and C. F. Jackson of the University of New Hampshire has similarly loaned specimens from his collection.

All previously published records from the Labrador Peninsula represent localities along the northern shore of the Gulf of St. Lawrence. It now appears that the species is distributed over the entire peninsula, except possibly the most barren part of northern Ungava. The Labrador area has been less studied by mammalogists than other parts of North America, but it is still remarkable that so few water shrews have been collected. Fort Chimo is perhaps the best known collecting locality in the area; numerous specimens of mammals were taken there nearly seventy years ago by L. M. Turner and at later dates by other collectors, but it was not until 1947 that water shrews were caught.

There is little available information concerning the natural history and preferred habitat of the shrews. The two Fort Chimo specimens were caught, along with numerous *Sorex cinereus cinereus* and *Microtus pennsylvanicus labradorius*, in the small area of meadow-like grassland that surrounds the Hudson's Bay Company post buildings. This locality is approximately at the northern limit of tree growth, where small patches of stunted spruce and larch trees are surrounded by tundra and muskeg. Cartwright and Red Bay are in the treeless strip of country bordering the Labrador coast, and the remaining localities are in or bordering spruce-forest areas. There is no apparent altitudinal restriction; most of the specimens were taken near sea level, and the one from Astray Lake was on the height-of-land on the main divide of the peninsula. Labels of three of the specimens bear the following collector's notations:

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"Rare and seldom seen; picked up dead on the road" (E. Doane at Cartwright); "Run in sphagnum and reindeer moss in spruce thicket. Bottom of gully" (H. W. Jackson at Point St. Charles); "Damp gully in cliff, very wet and cold" (H. W. Jackson at Seal River). These shrews are apparently less restricted to a streamside habitat than is *Sorex palustris navigator* in the relatively arid mountains of western North America.

Study of the available specimens indicates that there are three subspecies of *Sorex palustris* on the Labrador Peninsula, one of which has not been previously described.

***Sorex palustris turneri*, new subspecies**

Type locality.—Fort Chimo (on the eastern bank of the Koksoak River, lat. 58° 8' N., long. 68° 15' W.), Ungava district, Quebec, Canada.

Type specimen.—U. S. National Museum No. 282879; skin and skull, adult male in summer pelage; collected October 4, 1947, by Maj. Robert Traub and Sgt. Donald Koelle; prepared by D. H. Johnson, original number 5216.

Characters.—Upperparts in summer pelage Fuscous-Black (this and other capitalized color terms after Ridgway, 1912), darker than in any of the described races of *Sorex palustris* except possibly *brooksi* of Vancouver Island; belly Mouse Gray; underparts in general, including underside of tail and inner sides of feet, paler than in *labradorensis*, *albibarbis*, and *hydroadistes*, darker than in *gloveralleni*, *palustris*, and *navigator*; underparts less suffused with brownish color than in any of the foregoing races except *palustris*; tail bicolored almost to tip. Winter pelage unknown. Skull small, with relatively weak rostrum and broad braincase. For measurements see Table I.

Remarks.—Of all the races of *Sorex palustris* described from eastern North America, this one is outstanding for the reduction of the amount of brown pigment visible in the summer pelage. With the unusually dark upperparts, this produces a distinctive black-and-gray appearance. The darkened skin on the back of each specimen indicates that molt to winter pelage would take place shortly after October 4, the date on which they were collected.

The nearest relative, both geographically and in point of characters, is *S. p. labradorensis*, and intergradation is presumed to take place with that race. There is, however, a gap of 400 or more miles from which no specimens are available between the nearest localities of the two races.

This race was discovered in the course of a survey of small mammals and their ectoparasites occurring about air bases in northeastern North America conducted by the Army Medical Service Graduate School and the Smithsonian Institution in the autumn of 1947. It is named in honor of Lucien McShan Turner, who in 1882 and 1883, while attached to the U. S. Signal Service, made the first important collection of mammals in the Ungava region.

Specimens examined.—Two, from the type locality (U. S. Nat. Mus. Nos. 282879 and 282880, skins and skulls).

***Sorex palustris labradorensis* Burt**

Sorex palustris labradorensis Burt, Occas. Papers Mus. Zool. Univ. Michi-

gan, No. 383, p. 1. August 27, 1938.

Type locality.—Red Bay, Strait of Belle Isle, Labrador.

Type specimen.—Univ. Michigan Mus. Zool., No. 68109; skin and skull, adult female in winter pelage; collected February 9, 1933, by E. Doane (Burt, 1938).

Characters.—Color in summer pelage (based on specimens from Astray Lake and Cartwright): Upperparts between Fuscous and Fuscous-Black, with a scattering of brownish hair tips; underparts near Hair Brown, slightly paler on throat; pale area on underside of tail indistinct beyond proximal third. In winter pelage (as described by Burt, 1938, p. 2): "Upperparts fuscous black, underparts silver gray. . . Tail bicolor, black above with whitish ventral stripe extending about three-fourths distance to tip." For measurements, see Table I.

Remarks.—Burt considered *labradorensis* a small race because the skull of the type has a condylobasal length of only 19.7 mm., but a specimen of the same sex from nearby Cartwright is larger, with a condylobasal length of 20.4 mm.

Records of occurrence.—Three localities are represented:

Cartwright, Labrador (on the coast south of Hamilton Inlet, lat. 53° 48' N., long. 56° 59' W.). One specimen examined (Carnegie Mus. No. 17981, skin and skull).

Red Bay, Labrador (on the Strait of Belle Isle, lat. 51° 45' N., long. 56° 24' W.). Type specimen of *labradorensis*, recorded by Burt (1938, p. 1).

Astray Lake, Quebec ("on the height of land between Ste. Margaret River and Swampy Bay River," approximate lat. 53° N., long. 67° W.). One specimen examined (Carnegie Mus. No. 4103, skin only).

Sorex palustris gloveralleni Jackson

Neosorex palustris acadicus G. M. Allen, Proc. Biol. Soc. Washington, vol. 28, p. 15. February 12, 1915. (Name preoccupied by *Sorex acadicus* Gilpin 1867).

Sorex palustris gloveralleni H. H. T. Jackson, Jour. Mammalogy, vol. 7, p. 57. February 15, 1926. (Renaming of *acadicus* Allen.)

Type locality.—Digby, Nova Scotia.

Type specimen.—Bangs Collection, Museum of Comparative Zoology, No. 2046; skin and skull, adult female; collected July 26, 1894, by Outram Bangs.

Characters.—Color in summer pelage (based on specimens from Point St. Charles and Seal River): Upperparts near Fuscous-Black; underparts Light Drab; pale area on underside of tail extending completely to tip. Skull about as in *albibarbis* and *labradorensis*, smaller than in *palustris*.

Remarks.—In the pale underparts and the well marked light streak extending to the tip on the underside of the tail, the specimens from the northern shore of the Gulf of St. Lawrence resemble both *palustris* and *gloveralleni* and are sharply distinct from the other, darker-bellied, eastern races. In their small size (see Table I for measurements) they resemble *gloveralleni* rather than *palustris*. The three specimens from Godbout have been in alcohol for many years and as a result their colors

are badly faded. One of these is in winter pelage and has very pale underparts; the other two are in summer pelage and have far more contrast in color between the dorsal and ventral color areas than exists in skins of *albibarbis*. They were considered intermediate between *gloveralleni* and *albibarbis* and tentatively referred to the latter race by H. H. T. Jackson (1928, p. 182). The Seal River and Point St. Charles specimens were correctly identified as *gloveralleni* by C. F. Jackson (1938, pp. 431-432), and, with the presence of this race definitely established north of the St. Lawrence, the specimens from Godbout are best included under it.

Records of occurrence.—The following five specimens have been examined from the Labrador Peninsula:

Point St. Charles and Seal River, Quebec (vicinity of Moisie River on the Gulf of St. Lawrence, approximate lat. 50° 20' N., long. 66° W.). Two specimens (C. F. Jackson Coll. Nos. 373 and 374, skins and skulls); previously recorded by C. F. Jackson (1938, p. 342).
 Godbout, Quebec (on the Gulf of St. Lawrence, lat. 49° 19' N., long. 67° 37' W.). Three specimens examined (U. S. Nat. Mus. Nos. 74651, 99185, and 178503, all alcoholics with skulls removed and cleaned); previously recorded by H. H. T. Jackson (1928, p. 183) as *S. p. albibarbis*.

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TABLE I. Specimens and measurements in millimeters of *Sorex palustris* from the Labrador Peninsula¹

Specimen	Locality	Date and Collector	Head and Body	Tail	Hind foot	Ear	Condylabasal length	Palatal length	Cranial breadth	Interorbital breadth	Maxillary breadth	Maxillary toothrow
U.S.N.M., 282879, ♂ <i>turneri</i> (type)	Fort Chimo, Ungava	Oct. 4, 1947 Traub & Koelle	80	73	19	6	19.6	8.4	9.8	4.0	5.7	7.5
U.S.N.M., 282880, ♀ <i>turneri</i>	Fort Chimo, Ungava	Oct. 4, 1947 Traub & Koelle	80	69	18	8	19.1	8.0	10.1	4.0	---	7.4
Carnegie, 4103, ♀? <i>labradorensis</i>	Astray Lake, Quebec	Aug. 1, 1917 O. J. Murie	---	---	---	---	---	---	---	---	---	---
Carnegie, 17981, ♀ <i>labradorensis</i>	Cartwright, Labrador	Aug. 27, 1939 E. Doane	80	75	20	8	20.4	8.4	9.9	3.9	5.8	7.7
Univ. Mich., 68109, ♀ ² <i>labradorensis</i> (type)	Red Bay, Labrador	Feb. 9, 1933 E. Doane	75	71	20	---	19.7	8.6	9.7	4.4	5.9	7.7
Jackson Coll., 373 ♀ <i>gloveralleni</i>	Pt. St. Charles, Quebec	Aug. 26, 1937 H. W. Jackson	97 ³	77	20	---	20.6	8.4	---	4.1	6.0	7.7
Jackson Coll., 374 ♂ <i>gloveralleni</i>	Seal River, Quebec	Sept. 3, 1937 H. W. Jackson	81	73	20	---	20.6	8.8	10.0	3.8	6.5	7.6
U.S.N.M., 74651, ♂ ⁴ <i>gloveralleni</i>	Godbout, Quebec	July 29, 1895 N. A. Comeau	---	74	21	7	---	8.1	---	4.0	6.5	7.6
U.S.N.M., 99185 ⁴ <i>gloveralleni</i>	Godbout, Quebec	June 12, 1899 N. A. Comeau	---	75	20	7	19.8	8.3	9.7	3.8	---	7.5
U.S.N.M., 178503 ⁴ <i>gloveralleni</i>	Godbout, Quebec	Aug. 27, 1898 N. A. Comeau	---	69	21	7	19.9	8.2	9.7	3.8	5.6	7.6

¹External measurements from specimen labels; cranial measurements as described by H. H. T. Jackson (1928, p. 13)²Measurements as given by Burt (1938, p. 1)³This is evidently an error⁴External measurements from specimen in alcohol

PROCEEDINGS
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NEW GENERA AND SPECIES OF CHORDEUMOID MILLIPEDS
IN THE UNITED STATES, AND NOTES ON SOME
ESTABLISHED SPECIES

BY NELL B. CAUSEY
Fayetteville, Arkansas

The millipeds of Suborder Chordeumoidea are of particular interest because of the many modifications of the ninth legs of the males. These legs, which are referred to as posterior gonopods by European writers, vary from the normal seven segments down to seemingly functionless stubs coalesced with the sternite of the seventh segment. The body length may be as little as 2 or 3 mm; the number of postcephalic segments may be 20, 26, 28, 30, or 32; and the color may vary from white to dark brown.

Except for the excellent monograph by Cook and Collins (1895), the only published works on chordeumoid millipeds in the United States are a few short papers and descriptions of a few species in papers dealing chiefly with other groups of Diplopoda. The families, in general, remain poorly defined.

The specimens described in this paper came either from the author's private collection or from the collection of the Illinois Natural History Survey. Holotypes of *Trigenotyla parca*, *Ofcookogona steuartae*, and *O. alia* will be deposited in the collection of the Philadelphia Academy of Science. Paratypes of these and the holotype of *Flagellopetalum stannardi* are in the collection of the Illinois Natural History Survey. Unless stated otherwise, collection was by the author.

Cohort Trachyzona
Family Rhiscosomidae
Tingupa pallida Loomis

Tingupa pallida Loomis, 1939, Bull. Mus. Comp. Zool., vol. 86, no. 4, p. 185, fig. 12; 1943, *ibid.* vol. 92, no. 7, p. 387, fig. 7.

Record.—Two males and a female from Collinsville, Ill., by T. H. Frison, Feb. 9, 1944, from ground cover. Previous records of this species are based on collections from Missouri caves (Loomis 1939, 1943; Hubricht 1950).

Tingupa sp.

Record.—A female of 26 segments, length 4.8 mm, width 1.3 mm, South Fulton, Tenn., by L. J. Stannard, June 30, 1948, Acc. No. 49462. This is the first record of this genus from a Southern state.

Cohort Xestozona
Family Conotylidae
Conotyla specus Loomis

Conotyla specus Loomis, 1939, Bull. Mus. Comp. Zool., vol. 86, no. 4, p. 184, fig. 11.

Records.—Two males and a female from Mt. Carroll, Carroll Co., Ill., by H. H. Ross and M. W. Sanderson, Dec. 6, 1945; one male and two larvae from Echert's Cave, Burksville, Ill., by B. D. Burks, Jan. 24, 1947. Previous records of this species are based on collections from Missouri caves (Loomis 1939, 1943; Hubricht 1950).

Trigenotyla, new genus

Differs from both *Tynopus* Chamberlin 1940 and *Conotyla* Cook and Collins 1895 in that the basal segment of the ninth legs of the male is prolonged ventrad beyond its articulation with the smaller second segment. Ocelli about 15, in a triangular area; antennae slightly clavate; no promentum. First and second legs of male with six segments, the tarsi hispid; second through fifth legs with minute vesicles on tarsi; legs six and seven modified. Tergites smooth, keels about as wide as long on the middle segments. Each gonopod, as in several *Conotyla* species, consists of a ventral lamella and of a dorsal, plumose piece. Thirty segments. Body small as in *Tynopus*.

Genotype.—*Trigenotyla parca*, n. sp.

Trigenotyla parca, n. sp.

Figs. 1-5

Male holotype.—Color light amber; antennae brown, ratio of length of segments 1 through 7 4:10:22:13:20:7:6; ocelli black, in rows of 1, 7, 5, 3, 1; vertex highly rounded between eyes; anterior margin of column convex, posterior margin straight, its keels rounded; keels prominent on anterior and middle segments, becoming smaller posteriorly and absent from last 3 or 4 segments; on the middle body segments the keels are about as wide as long, the anterior corners rounded and the posterior right angles; segmental setae needle like, the length from 0.3 to more than 1.0 mm, set in relatively large tubercles in straight or curved line.

First and second legs slightly shorter than others; third segment of sixth and fourth segment of seventh legs with a low, proximal swelling and a distal projection; fourth segment of sixth legs bowed and slightly enlarged proximad (Figs. 1, 2). Ninth legs but slightly visible *in situ*; the basal segment, a coxoprefemur, is L-shaped, the vertical branch continuing beyond its articulation with the second segment, distally truncated and pigmented; the second segment is smaller, clawless, slightly clavate, and the distal end is darkly pigmented (Fig. 3). Coxae of tenth and eleventh legs slightly swollen and with the usual gland openings.

Each gonopod consists of two regions: the ventral region is a lamella broad at the base and deeply bifid distally, the anterior division wider and longer than the posterior and serrated along the posterior margin; the dorsal region consists of a shorter, plumose piece (Figs. 4, 5).

Length about 6.5 mm, width 0.9 mm.

Type locality.—Blue Spring, Carroll Co., Ark., 6 males and 6 females, Oct. 29, 1949. Collections have been made at several places in Washington County also.

Trichopetalum unicum Cook and Collins

Trichopetalum unicum Cook and Collins, 1895, Ann. N. Y. Acad. Sci., vol. 9, p. 66, fig. 51.

Records.—Rocky Branch, Clark Co., Ill., 1 male by H. H. Ross, Acc. No. 49554; Spring Hill Park, Ind., 1 male, 5 females by T. H. Frison, Feb. 25, 1944; several places in Washington and Logan counties, Arkansas.

Trichopetalum cornutum Cook and Collins

Trichopetalum cornutum Cook and Collins, 1895, *ibid.*, p. 66, figs. 46-49.

Records.—Marshall, Ill., 1 male, 4 females, several larvae by T. H. Frison, Jan. 1, 1933, sample no. 32; Donaldson, Ill., 3 males by L. J. Stannard, Oct. 19, 1947; Turkey Run State Park, Montgomery Co., Ind., 3 males, 4 females by M. W. Sanderson, Oct. 10, 1948, Acc. No. 49524.

Trichopetalum lunatum Harger

Figs. 6-8

Trichopetalum lunatum Cook and Collins, 1895, *ibid.*, p. 63, figs. 52-54.

Four males and several females collected by L. J. Stannard, Telford, Pa., Oct. 1, 1947, Acc. No. 4943, are believed to be Harger's poorly described *T. lunatum*. It is regretted that no specimens of *T. album* are available for comparison, because the Pennsylvania specimens are very similar to that species. The two are probably indistinguishable as to body length, color, ocelli, etc. The ninth legs of *lunatum* (Fig. 6) have no processes on the coxosternal region; if the figure shown by Cook and Collins (1895, fig. 43) is correctly drawn, *album* has prominent triangular processes in that region. The telopodites of the gonopods are contiguous only at the base and at the distal end. They extend to the base of the eleventh legs. Laterad the basal two-thirds of the telopodite is finely pubescent; mesiad about midway of its length are three stout setae; on its mesial surface is a thin, triangular lobe, visible *in situ* and not shown in the figure for *album*; the end is flattened (Fig. 7) and hamate. Springing from near the base of the telopodite, mesiad, is a single plumule; there are two of these in *album*. The dorsal lamella, with two triangular pieces on the posterior margin, appears in *album* to have only one triangular piece.

Flagellopetalum, new genus

Resembles *Trichopetalum* in the small size of the body, in having 28 segments behind the head, in the presence of keels on most body segments, the conspicuous needle-like segmental setae, the slightly clavate antennae, the triangular promontum, the presence of short, stiff setae on the mesial surface of the tarsi of the first and second legs, in the smaller size and absence of a segment in those legs, and in that the ninth legs of the male consist of only two segments, the basal of which has no lamella or processes. It differs from *Trichopetalum* in that the ocelli are fewer and in one row, the sixth legs of the male have a lobe on the

fourth segment, the second segment of the ninth legs is less swollen and has no terminal, chitinized knob, and the gonopods have no plumose piece. The gonopods consist of three pairs of lamellae, of which the dorsal pair is coalesced at the base and terminates in a pair of fine, flagelloid processes.

Genotype.—*Flagellopetalum stannardi*, n. sp.

***Flagellopetalum stannardi*, n. sp.**

Figs. 9-12

Male holotype.—White with light gray bands across the prozonites and metazonites. Eyes composed of five ocelli arranged in a single curved line on a darkly pigmented horizontal band. Keels of middle body region as shown in figure 9, decreasing in size posteriorly, the last three segments without keels. Segmental setae needle-like, relatively long. Surface of tergites appear lightly longitudinally striate when viewed under high magnification.

As shown in figure 10, the fourth segment of the sixth leg bears a small lobe on the mesial surface. No other anterior legs are modified except the first and second, as explained in the definition of the genus. The tenth and eleventh legs have the usual coxal openings. The ninth legs are shown in figure 11; they are not inflated and the coxoprefemur, which is distinct from the sternite, bears no processes.

The gonopods (Figs. 11, 12) consist of three pairs of lamellae: the dorsal lamellae, probably sternites, are coalesced at the base, but distally they are flagelloid; both surfaces of the middle lamellae are finely hispid, and laterally each bears a curved, aciculate process; the ventral lamellae bear a pair of sharp spines of the ventral surface and acute lobes on the distal margin.

Length 4.5 mm.

Type locality.—Rocky Branch, Clark Co., Ill. The male holotype and a larva were collected Oct. 19, 1947 by L. J. Stannard, for whom it is a pleasure to name this species.

Family Cleidogonidae

***Ofcookogona*, new genus**

Resembles *Tiganogona* Chamberlin 1928 in the close union between the dorsal branches of the gonopods and the coxal region of the ninth legs and in the presence of a clavate sternal process anterior to the ninth legs. It differs from *Tiganogona*, in which the ninth legs appear to consist of five segments, in that those legs consist of the following three segments: a swollen basal segment with lobes; a medial, smaller, spherical segment; and a terminal, minute segment. The male gonopods, which are heavier than in *Tiganogona*, consist of well developed cheirites, a single medial piece, and the usual dorsal and ventral branches. The eyes are triangular, the ocelli black and numbering under 20. Antennae long and slender as is usual in the family. Tergites smooth, no keels, color typical of the family. First and second legs reduced in size. Tarsi of legs three through seven, ten and eleven with papillose cushion on mesial surface. Third segment of eleventh legs of males modified; tenth and eleventh legs with the usual gland opening on the coxae.

Genotype.—*Ofcookogona steuartae*, n. sp.

Ofcookogona steuartae, n. sp.

Fig. 13

Male holotype.—Ocelli in rows of 1, 7, 6, 5, 4, 3, 1. On the proximal end of the medio caudal surface of the eleventh legs is a cylindrical process. The tenth legs are unmodified. The ninth legs are not visible until the pleura are removed; the inflated basal segment has two lobes on the dorsal surface; the spherical second segment and the minute terminal segment are difficult to distinguish from the basal segment. The presence of a terminal claw is doubtful. Slightly anterior to the ninth legs is a clavate sternal peg, which is about two-thirds as long as the two finger-like coxal lobes adjacent to it.

In situ, lateral view, the ventral branches of the gonopods appear almost parallel to the longitudinal body axis, reaching to the base of the eleventh legs; in ventral view they appear as two elongated wedges, the apices contiguous and the bases well separated. The distal third of each ventral branch bears along the dorsal surface a thin lamella, its dorsal margin finely serrated. The dorsal branches of the gonopods are falcate rather than clavate, as in many species of this family. The cheirites, the triangular lateral pieces, are well developed.

Length 13 mm, width 1.3 mm.

Type locality.—Greenwood, Sebastian Co., Ark. The male holotype, the only specimen, was collected Nov. 26, 1950, by Miss Ruth Steuart, for whom it is a pleasure to name the species.

Ofcookogona alia, n. sp.

Figs. 14-16

Easily separated from *O. steuartae* by the absence of a serrated margin on the ventral branch of the gonopods and by difference in the shape of the ninth legs.

Male holotype.—Ocelli in rows of 1, 7, 6, 5, 4, 2. Modification of legs as in *steuartae*.

The ninth legs are not as inflated as in *steuartae*. From the cephalic surface of the coxal region of each one a finger-like lobe passes up to the base of the ventral branch of the gonopod. A smaller lobe is embraced medially by the dorsal branch of the gonopod. The small, globose, darkly pigmented segment appears to be the second; distal to it, and easily overlooked, is a minute knob, the third segment probably. Slightly anterior to the ninth legs is the sternal peg, not broadly clavate as in *steuartae*, the surface finely and uniformly roughened and the length about half that of the coxal lobes adjacent to it (Fig. 14).

In situ, ventral view, the ventral branches of the gonopods are contiguous at the base and separate distally in a V-shape; the apices rest on the ventral surface of the coxae of the tenth legs. In lateral view each gonopod, as in *steuartae*, is seen to be composed of four pieces (Fig. 15): the ventral, broadly curved piece; the dorso-lateral triangular cheirite with a row of a few stiff setae; the dorsal arcuate piece, spathulate in dorsal view (Fig. 16), which embraces the medial sternal peg of the ninth segment; and the mesial, excavated piece.

Length about 11 mm.

Type locality.—Junction City, Union Co., Ark. Two males and a female were collected from a pine-hardwood forest Dec. 25, 1950.

Tiganogona Chamberlin

Figs. 17 and 18

Tiganogona Chamberlin, 1928, Ent. News, vol. 39, p. 154.*Tiganogona* Causey, 1950, Jour. Wash. Acad. Sci., vol. 41, no. 2, p. 82.

Figures 17 and 18 show the right ninth leg and the end of the ventral branch of the right gonopod of a male paratype from St. Charles, Mo. The dorsal branches of the gonopods are similar to those of *Tiganogona moesta* Causey.

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EXPLANATION OF FIGURES

Plate X

Trigenotyla parca, male paratype.

- Fig. 1. Second, third, and fourth segments of sixth leg.
- Fig. 2. Fourth segment of seventh leg.
- Fig. 3. Caudal view of right ninth leg.
- Fig. 4. Ventral view of right gonopod.
- Fig. 5. Lateral view of right gonopod.

Trichopetalum lunatum Harger, male.

- Fig. 6. Caudal view of right ninth leg.
- Fig. 7. End of telopodite of right gonopod.
- Fig. 8. Dorsal view of left gonopod.

Flagellopetalum stannardi, male holotype.

- Fig. 9. Right side of tergite of twelfth segment.
- Fig. 10. Right sixth leg.
- Fig. 11. Right ninth leg and gonopod, caudal view.
- Fig. 12. Dorsal view of gonopods.

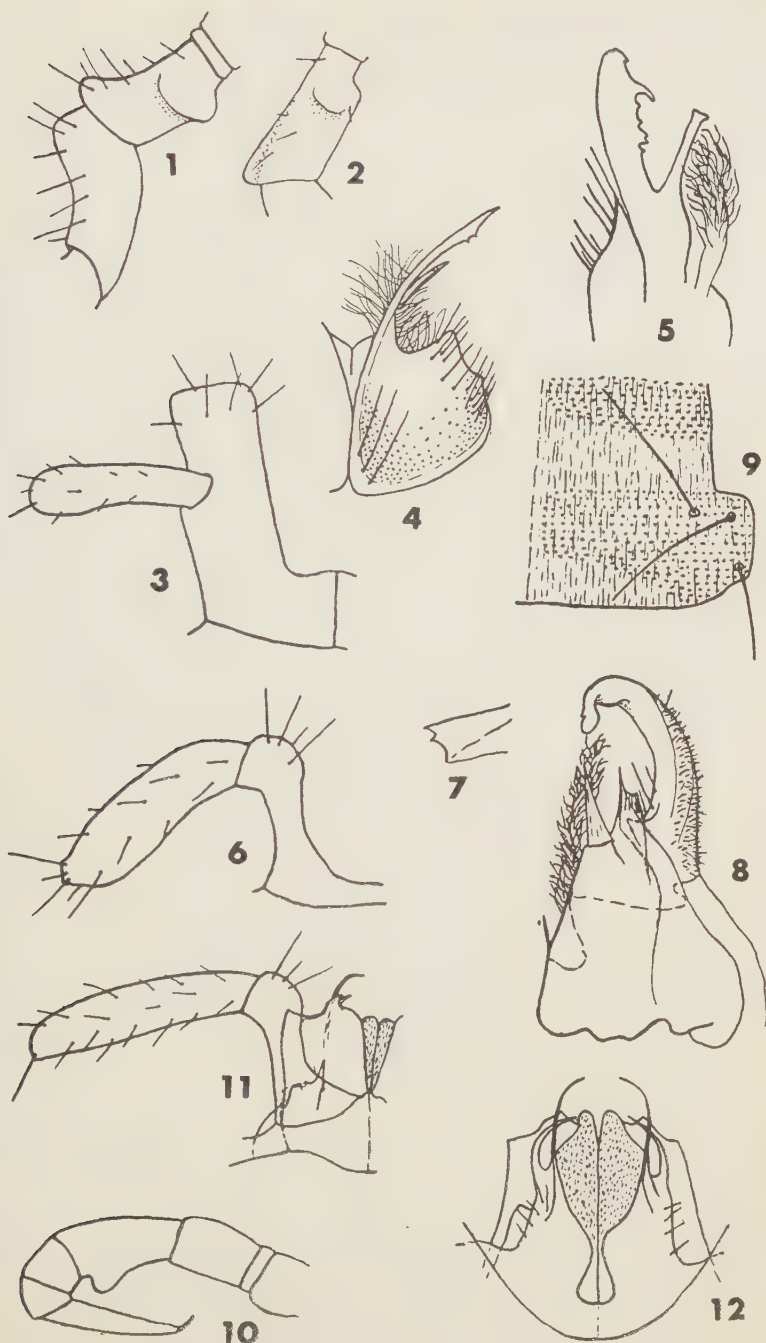


PLATE X

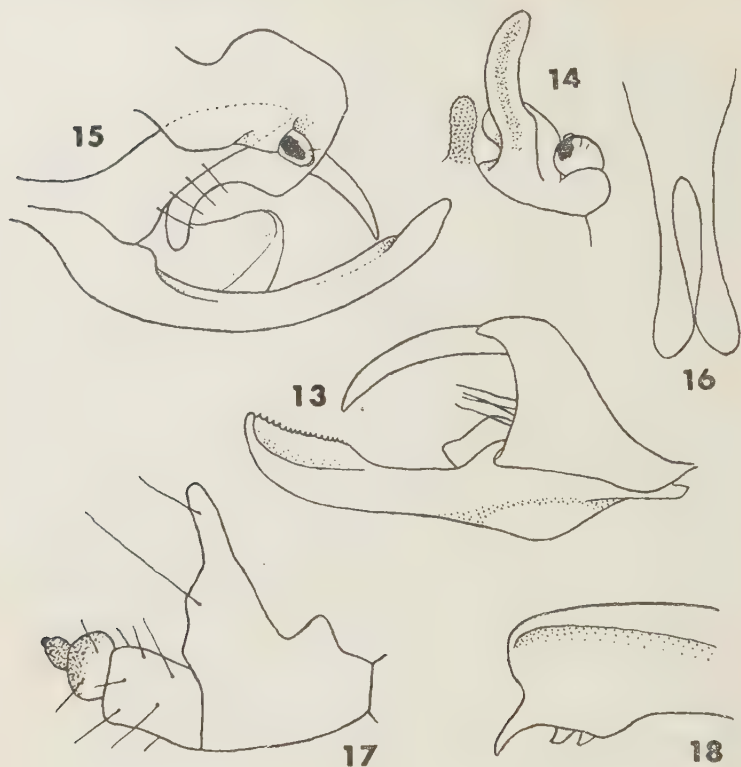


Plate XI

Ofcookogona stewartae, male holotype.

Fig. 13. Lateral view of left gonopod.

Ofcookogona alia, male paratype.

Fig. 14. Anterior view of sternal peg and right ninth leg.

Fig. 15. Lateral view of left ninth leg and gonopod.

Fig. 16. Dorsal pieces of gonopods.

Tiganogona brownae Chamberlin, male paratype.

Fig. 17. Caudal view of right ninth leg.

Fig. 18. End of ventral branch of right gonopod.

PROCEEDINGS
OF THE
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**A NEW RACE OF DUSKY GROUSE (*DENDRAGAPUS OBSCURUS*)
FROM THE GREAT BASIN**

BY WILLIAM H. BEHLE AND ROBERT K. SELANDER

A systematic review of the subspecies of *Dendragapus obscurus* was presented by Swarth (Proc. Calif. Acad. Sci. (4), 20, 1931:1-7) when he described the race *D. o. pallidus*. His material, however, did not reveal the picture of variation in the Great Basin. He commented that conditions were not clear at the southern boundaries of *richardsonii* and *pallidus* and in the territory where either or both approach the range of *obscurus*. Subsequently, Linsdale (Pacific Coast Avifauna No. 23, 1936:47), in his study of the birds of Nevada, assigned the grouse from the desert mountain ranges of the central portion of the state (Toyabe, Toquima and Monitor mountains) to *pallidus* and those from the northeastern and central eastern sections (East Humboldt, Jarbidge, Shell Creek and Snake mountains) to *obscurus*.

During our recent field work in the Deep Creek Mountains of central western Utah, adjacent to the Goshute Indian Reservation just north of the Snake Range of Nevada, several specimens were obtained which, on the basis of the literature, we expected to represent *obscurus*. Such did not prove to be the case, and a study of the Dusky Grouse of the entire Great Basin and surrounding areas has convinced us that a different race exists in eastern Nevada and western Utah which we now describe as

***Dendragapus obscurus oreinus*, new subspecies**

Great Basin Dusky Grouse

Type.—Adult ♂, No. 10779, University of Utah, Museum of Zoology; 3 miles north of Queen of Sheba Mine, 7500 feet, west side Deep Creek Mountains, Juab County, Utah; April 23, 1950; Collected by Robert K. Selander, original number 556; testis 14 mm.

Subspecific characters.—Compared with *obscurus*, adult males of *oreinus* have the ground color of the feathers of the dorsum a lighter brown; they show more white on the edgings of the scapulars, primary and secondary coverts; the vermiculations of the scapulars, sides, flanks and wing coverts are paler and grayer. The latter distinctions are especially noticeable from a lateral view and the mass effect is a paler, grayer bird than *obscurus*. Females are even more distinct, those of *oreinus* being paler and possessing tan, buff, and gray colors rather than rich brown. This is most evident on the scapulars, wing coverts, and flanks. Nape and auriculars gray instead of light buff as in *obscurus*.

Differs from *richardsonii* in the possession of a distinct tail band and rounded tail. Plumage of upper parts generally paler through having a brown rather than fuscous-black ground color, and the vermiculations of the flanks, sides, wing coverts, and scapulars are lighter and thus more conspicuous. Males more easily distinguishable from *richardsonii* than females.

Differs from *pallidus* in much the same way as from *richardsonii*, the principal distinguishing character being the possession of the tail band and rounded tail.

Measurements.—Adult male (12 specimens); wing, 224.0-249.0 (236.6); tail, 158.5-184.7 (175.2). Adult female (9 specimens); wing, 208.5-221.0 (216.2); tail, 133.0-144.5 (139.9).

Geographic distribution.—Known from the Deep Creek Mountains in central western Utah, Snake Range in central eastern Nevada, Ruby Mountains of northeastern Nevada and Toyabe Range in central Nevada.

Specimens examined.—*Utah*: Juab County: head of Pass Creek, 8000 feet, 6 miles east Indian Village, Deep Creek Mountains, 2 (June); 3 miles north of Queen of Sheba Mine, 7500 feet, west side Deep Creek Mountains, 2 (April); Queen of Sheba Mine, 9000 feet, west side Deep Creek Mountains, 1 (May). *Nevada*: White Pine County: Baker Creek, 11,000 ft., Snake Range, 2 (Aug.); Pole Canyon, 8200 feet, Snake Mountains, 1 (June); head of Deadman Creek, 9300 feet, Mt. Moriah, 1 (June). Elko County: west side Ruby Lake, 6 miles north Elko County line, 11 (Nov., Dec.); Harrison Pass R. S., Green Mountain Canyon, Ruby Mountains, 4 (June); Three Lakes, Ruby Mountains, 2 (July); Long Creek, South Fork, Ruby Mountains, 2 (July). Nye County: Toquima Range, 1½ miles southeast Jefferson, 8600 feet, 2 (July). Lander County: Kingston Creek, 9600 feet, 1 (Sept.); South Fork of Big Creek, west side Toyabe Range, 2 (Oct.); Birch Creek, 8000 ft., 1 (June).

Remarks.—This Great Basin race apparently is more closely related to the *obscurus* stock of the Rocky Mountains to the east than to the *pallidus-richardsonii* population to the north. The latter population differs from *obscurus* in a number of distinctive ways. In ground color, *obscurus* is brown, less blackish while the northern population features a dark fuscous-black. In tail characters, *pallidus* and *richardsonii* have a truncate shape and no distinct terminal tail band, while *obscurus* has a well marked tail band and rounded shape. The race *oreinus* shares the rounded tail and terminal tail bar with *obscurus*, and though of a paler coloration, it possesses the warm brown ground color of that race. At the same time *oreinus* shows a different arrangement of characters by combining the tail shape and band of *obscurus* with the grayness of the feather edgings of *pallidus* and *richardsonii*.

Heretofore it has been thought that the extreme in pallor was reached in the race *pallidus* of south central British Columbia, eastern Washington and northeastern Oregon. Now it appears that the Great Basin population is even paler. Within the race *oreinus* the palest specimens examined by us are those from the type locality in the Deep Creek Mountains. Significantly, the paleness is manifest in juveniles as well as adults.

In the majority of males of this new race the tail band is pure gray and fully as deep as in *obscurus*. In some specimens of *pallidus* and

richardsonii a transverse line gives a suggestion of a band but the coloration of the tail anterior and posterior to this line is the same. In specimens from the Toyabe Mountains to the west in central Nevada the band is less deep and less distinctive, possessing a mottling which is a puzzling feature. This character probably influenced Linsdale to refer these specimens to *pallidus*. There may, indeed, be intergradation over an extended area between *oreinus* and *pallidus* beginning in this area. These Toyabe specimens now seem best placed with *oreinus*, however.

Possible intergradation between *oreinus* and either *pallidus* or *richardsonii* is indicated by a female from Bear Creek, 8000 feet, Jarbidge Mountains, Elko County, Nevada which locality is near the Idaho border. It shows a darker coloration than *oreinus* and a rather poorly developed tail band. Another female from one mile east of Strawberry Creek Ranger Station, Wasatch Mountains, Franklin County, Idaho is seemingly intermediate between *richardsonii* and *obscurus*, closest perhaps to the former, because of its dark coloration and small, poorly defined tail band. Specimens of *obscurus* from the Wasatch Mountains of Utah are generally somewhat paler than examples of that race from Colorado and New Mexico. A break occurs between *oreinus* and *obscurus* west of the Wasatch Mountains, correlated with the desert hiatus. The Great Basin race, however, occupies isolated mountain ranges.

It is not certain whether there are significant differences between the several races in measureable characters. The figures given in Ridgway and Friedmann (Bull. U. S. Nat. Mus., 50, Pt. 10, 1946:82-89) suggest that the males of *pallidus* and *obscurus* are of similar size, with those of *richardsonii* being smaller. The females of *richardsonii* and *pallidus* are about the same size with those of *obscurus* being slightly larger. Our data based on adult birds indicate that the wing and tail lengths of *oreinus* are slightly longer than in *obscurus*. Before size differences can be attributed with certainty to these races there needs to be further evaluation of these characters based on much new material and furthermore the age differences noted by Swarth (Univ. Calif. Publ. Zool., 30 (4), 1926:78-84), must be taken into account.

We are indebted to Kenneth C. Parkes of Cornell University for the loan of several specimens from the Wasatch Mountains collected by J. Dan Webster and to the following persons for access to museum collections under their care: C. Lynn Hayward, Brigham Young University; Robert T. Orr, California Academy of Sciences; Alden H. Miller and Frank A. Pitelka, Museum of Vertebrate Zoology.

University of Utah, Salt Lake City, Utah.

PROCEEDINGS
OF THE
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ALLOSEBASTES, NEW SUBGENUS FOR SEBASTODES
SINENSIS, SCORPAENID FISH OF THE GULF OF CALIFORNIA¹

BY CARL L. HUBBS

The species of *Sebastes* that Gilbert (Proc. U. S. Nat. Mus., vol. 13, 1890, pp. 81-82) described from the Gulf of California as *Sebastichthys sinensis* is so distinct as to warrant its separation as the type and sole member of a new subgenus.

Allosebastes, new subgenus

The most notable character of this subgenus is the reduction of the anal soft-rays to 5—the number characteristic of *Scorpaena* and of most other tropical genera (Barnhart and Hubbs, Bull. Scripps Inst. Oceanogr. Univ. Calif., vol. 5, 1946, p. 373). As is often true, the value of this character lies in its consistency rather than in the amount of difference. The tropical genera normally with 5 anal soft-rays very seldom deviate from that number and all of the many other species of *Sebastes*, with rare individual exceptions, have 6 to 14 anal soft-rays, usually 6, 7, 8, or 9 (Jordan and Evermann, Bull. U. S. Nat. Mus., no. 47, pt. 2, 1898, pp. 1765-1835; Matsubara, Trans. Sigenkagaku Kenkyusho, vol. 1, 1943, p. 97).

The other fins have a ray formula that is normal for the genus *Sebastes*: dorsal, XIII, 12 (rather low but not uniquely so in number of soft-rays); caudal, 7 + 7 (principal rays); pectoral, i, 9, vii = 17 in each fin; pelvic, I, 5. The pertinence of the species to *Sebastes* or to a very closely related segregate is confirmed by such characters as the scaly, only moderately spiny and little distorted head, the posteriorly narrowed, unkeeled and unspined suborbital stay, the complete dentition, and the normal fins. The definite though thick and blunt intromittent organ of the male is similar to that of the species of *Sebastes*, all of which, so far as known, bear prolarvae.

Other more or less extreme though less trenchantly distinct characters of *S. sinensis* are the smooth, mostly cycloid scales; the unswollen lower pectoral rays; the excessively long anal spines (the second extends well beyond the longest soft-rays, the third almost reaches the tip of the longest soft-ray); the closely clumped subparallel upper 3 preopercular spines (the lower 2 are well separated and divergent); the protuberant posterior end of the mandible, almost resembling a flat spine; and, especially, the very firm, well-exposed suborbital stay (second suborbital), with the bone widened about the unusually large pore, which has a somewhat raised and roughened rim.

¹Contributions from the University of California, Scripps Institution of Oceanography, New Series, No. 000. 546

The general distinctiveness of this species, as well as its reduced number of anal rays, is correlated with its restriction to the essentially tropical fauna of the Gulf of California, where it alone represents this speciose genus of the North Pacific (Jordan and Evermann, *l. c.*, 1898, pp. 1765-1835; Matsubara, *l. c.*, vol. 2, 1943, pp. 175-252, under *Sebastes*). Except for one species or species-complex ranging from Perú to South Africa, the entire genus is otherwise confined to the more temperate and to the boreal waters of the North Pacific (Hubbs, *Pac. Sci.*, vol. 4, 1950, p. 70). The disjunction of populations, both in the Southern Hemisphere and in the Gulf of California, presumably dates from some Pleistocene period of oceanic cooling (Hubbs, *Jour. Mar. Res.*, vol. 7, 1948 (1949), p. 463). There were presumably several such periods of cooling and *Sebastes sinensis* has probably been separated from its congeners since middle or early Pleistocene time.

It is not wholly clear, however, that *Sebastes (Allosebastes) sinensis* represents an offshoot from *Sebastes*, with the number of anal rays independently reduced. A thorough revision of the American species, with attention to such anatomical details as Matsubara (*l. c.*, 1943, vols. 1-2) used in his study of the species of the western Pacific, will be required before the phyletic position of *S. sinensis* can be interpreted with confidence. It may represent a group, or stage of evolution, now largely extinct, that is transitional between the temperate and the tropical genera, or *vice versa*. It may be shown to be so distinct as to warrant full generic separation. In some respects it resembles *Helicolenus*, from which it differs at least in the unkeeled suborbital stay and in the number of dorsal spines, 13 rather than 12 (a distinction of great significance in this group, because of the consistency of the difference). From each of the few genera with 13 dorsal spines and 5 anal soft-rays, as well as from all other genera except *Sebastes*, as these were distinguished by Matsubara, *S. sinensis* differs in several characters of acknowledged generic import.

Not having examined the species and not having noted its more distinctive features, classifiers of *Sebastes* have variously interpreted the relationships of *S. sinensis* in the large complex of species. Eigenmann and Beeson (*Am. Nat.*, vol. 27, 1893, p. 670) classed it, along with a miscellaneous assortment of other species, in their new genus *Pteropodus*. Cramer (*Proc. Calif. Acad. Sci.*, ser. 2, vol. 5, p. 600) associated it in his key with *zacentrus*, *elongatus*, *levis* and *rubrivinctus*, leaving all in *Sebastes* without even subgeneric separation. Jordan and Evermann (*Rept. U. S. Comm. Fish and Fish.*, 1895 (1896), p. 431 and *Bull. U. S. Nat. Mus.*, no. 47, pt. 2, 1898, p. 1776), essentially adopting Cramer's arrangement, combined *sinensis* with the 4 species just named in their new subgenus *Hispanicus*.

This note is based on a recent examination of the holotype of *Sebastichthys sinensis* (U.S.N.M. No. 43085). Only the holotype and 1 paratype have been collected, both at Albatross Station 3015 in the Gulf of California, at a depth of 145 fathoms, at 29° 19' 00" N. Lat., 112° 50' 00" W. Long.

PROCEEDINGS
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NEW RECORDS OF NEOTROPICAL GENTIANACEAE—II

BY JOSEPH EWAN

Tulane University, New Orleans

This series of notes on an undescribed species of *Lisianthus*, and notable records in three other genera, *Centaurium*, *Lehmanniella*, and *Macrocarpaea*, supplements an earlier summary of current studies on neotropical Gentianaceae.¹

Centaurium

1. *Centaurium pulchellum* (Sw.) Hayek, Oesterr. Bot. Zeitschr. 56:70. 1906.

Gentiana centaurium var. _____ L., Sp. Pl. 1: 230. 1753.

Gentiana pulchella Swartz, Kongl. Vetensk. Akad. Nya Handl. för ar 1783: 85. t. 3. figs. 8, 9. 1783.

Erythraea ramosissima Pers., Syn. 1:283. 1805.

This much named European centaury may be distinguished from the related *Centaurium umbellatum* Gilib. by the generally loosely branched cymose-paniculate inflorescence, the smaller cauline and the always inconspicuous basal leaves withering at anthesis, and the generally lower habit of the plant. Some collections studied are transitional between the two species, however, and these individuals have been made the basis of several described microspecies in Europe. The synonymy of these forms was already complicated a century ago when Grisebach prepared the account of the family for the *Prodromus*,² under the name *Erythraea ramosissima* Pers. Grisebach did refer at that time to its introduction into the Americas. William Darlington reported it as first detected in Chester County, Pennsylvania, in July, 1835, but it has not evidently persisted as an aggressively spreading species in our flora.³ Muhlenberg noticed the species even earlier under the name *Chironia pulchella* as a species of the Pennsylvania flora⁴ but the full details of that intricate story must await a search in the historic collections at Philadelphia now in progress.⁵

Outside of the United States early collections of *Centaurium pulchellum* were made in the West Indies, first in Bermuda at St. George, May 23, 1854, I. F. Holton 469 (K⁶), and another collection labelled simply "Bermuda" without definite locality, Dec. 11, 1873, by the botanists of the *Challenger Expedition* (K). It was collected even earlier in Jamaica, without definite locality data being recorded, probably in 1838, by Dr. Gilbert McNab (K), and more recently on the island, at Morces Gap,

¹Proc. Biol. Soc. Wash. 63:163-166. 1950.

²DC., *Prodromus* 9:57. 1845.

³Flora Cestrica ed. 2. 126. 1837.

⁴Catalogue, 24. 1813.

⁵F. W. Pennell, Proc. Amer. Philos. Soc. 94:138. 1950.

⁶Abbreviations follow Index Herbariorum (Chron. Bot. 5:142. 1939).

5000 ft., *Geo. E. Nichols* 24 (K). For South America I have seen an early collection made in Uruguay: Montevideo, Dec. 1869, *Gibert* 932 (K). But it is in the Argentine that *Centaureum pulchellum* has become thoroughly established and evidently a fairly frequent weedy species in the provinces of Buenos Aires and Mendoza. Dr. Humberto A. Fabris, Museo La Plata, Argentina, has communicated a series of specimens illustrating the variations in branching, density of panicles, and leafiness among the colonies of that country. Representative collections are: Prov. Buenos Aires: Punta Lara, Jan. 24, 1949, *Fabris* 273 (NO), same loc., Jan. 4, 1940, *Genevieve Dawson* 930 (NY); Segui, Dec. 8, 1939, *A. L. Cabrera* 5632 (NY); Cocuodoro Rivadario, March, 1943, *Stefanicic* (NO); La Balandea, Dec. 19, 1948, *Fabris* 249 (NO); Castelli, Jan. 2, 1942, *Lagus* (NO); *sine loco*, *J. Walther*, Dec. 25, 1945, (NO).

2. *Centaureum umbellatum* Gilib., Fl. Lithuanica 1:35. 1781.

Just as *Centaureum pulchellum* has become thoroughly naturalized in parts of South America but remains a rare adventive in North America, *Centaureum umbellatum* reverses the pattern with well established colonies in widely scattered parts of the United States (e.g. California and New York) but is known from South America by only a few isolated collections. The South American collections of this species that have come to my notice are: Colombia: hacienda Obonuco, Pasto, 2550 m., Dept. Nariño, March 28, 1950, *R. Espinosa* 2767 (NO), where it is reported as infrequent. Chile: Apoquindo, 700 m., Dec. 1924, *Clarence Elliott* 102 (K); Tuscanada, 100 m., Llanguihue, *Werdermann* 673 (K). Argentina: Teurlingham, Prov. Buenos Aires, Jan. 1941, *Helga Schwabe* 193 (NO).

There is some evidence that the local Brazilian phase of this naturalized European species may represent a distinct form. It is represented by *Glasion* 6642 (K), from the Province Rio de Janiero.

Lehmanniella

3. *Lehmanniella splendens* (Hook.) Gilg

This showy scandent gentian of Colombia with crimson-scarlet flowers, the subject of a recent review,⁷ was locally plentiful in partial shade along the borders of the rain forest between the settlements of "El Socorro" and "Mulatto" in the San Lorenzo watershed, Rio Miel drainage, Dept. of Antioquia, 400 ft. ele., June 2, 1944, *Ewan* 15,787 (USNA, COL. NO), as a shrubby vine clambering over the other vegetation. Dr. Earl L. Core, with whom I travelled down the Rio La Miel to the Magdalena River, collected this plant at the same station. To one familiar with the chaparral of southern California in the spring the habit and posture of *Lehmanniella* recalls *Penstemon cordifolius*, and, like that scarlet-flowered climber, is likely visited by hummingbirds.

Lisianthus

4. *Lisianthus browallioides* n. sp.

Epiphytic shrub 2 m. high, the branches slender, finely fluted; leaves few and scattered, reduced to foliar bracts above, conspicuously petiolate, the petioles slender, 2 cm. long, joined by their bases into a low collar-like ring, the blades thin, dark green above, lighter green beneath, ovate, acuminate, the veins distinct below, obscure above, amphiglabrous, 6.5-8

⁷Caldasia 5:87-89. 1948.

cm. long, 3.5-4 cm. wide; flowers cymosely paniculate, 1-3 borne at the tips of the widely spreading panicle branches, very shortly pedicellate, the pedicels bracteate; calyx shallowly campanulate, 10-11 mm. long, puckered at the sinuses, the lobes flaring, lance-acuminate up to the subcaudate tips, dark-brown, paler and thin scarious on the margins; corolla campanulate, white, fading cream-colored, veins obscure but concolorous, 30-34 mm. long (including the lobes), strongly flaring at anthesis, suggesting the genus *Browallia*, the lobes lance-acuminate or abruptly cuspidate at anthesis, very finely erosulate; stamens not exerted; stigma bilamellate, the lobes spatulate, connivent; fruit and seeds unknown.

Frutex epiphyta, 2 m. alta, parte superiore caulis gracilis, striata; foliis paucis, superioribus reductis, prominente petiolatis, laminis ovatis, acuminatis, membranaceis, supra saturate viridibus, subtus pallidioribus, utrinque glabris, costa et venis subtus secundariis manifestis, supra obscuris, 6.5-8 cm. longis, 3.5-4 cm. latis, petiolis tenuis, mediocriter amplexicaulis, 2 cm. longis; floribus sparse cymoso-paniculis, 1-3 ad apicem ramosis, brevem pedicellis, pedicellis bracteatis; calyce turbinato-campanulato, 10-11 mm. longis, crispato ad sinum, lobis patentibus, lanceolatis et acuminatis, subcaudatis, obscure brunneis, margine pallidior, hyalino-scariosis; corolla campanulata, alba sed post anthesin ochroleuca, venis obscuris et concoloris, 30-34 mm. longis (lobis inclusis), limbo dilatato, lobis lanceo-acuminatis vel abrupte cuspidatis, minute erosulatis; staminibus inclusis; stigma bilamellata, lobis spatulatis conniventibus; capsula et seminibus ignotis.

Type collected in "tops of huge trees" on Robalo Trail, northern slopes of Cerro Horqueta, 6000-7000 feet ele., Prov. de Bocas del Toro, Panama, August 5-7, 1947, by Paul H. Allen 4932 (MO).

Lisianthus browalliioides is unlike any other species of the genus, constituting in a sense a separate section for its singular flaring campanulate corollas. Its shrub habit is also at variance with the familiar species of *Lisianthus*, *sensu stricto*, of tropical America as known from Central America and the West Indies. Its true position must await a comprehensive study of the genus as a whole with more material at hand than is available in this country alone.

Macrocarpaea

5. *Macrocarpaea glabra* (L.f.) Gilg

The first record for the Cordillera Central of Colombia for this species believed to be "localized in the Bogota region"⁸ is from Mendez, northeast of Silvia, Dept. of Cauca, 3000-3100 meters, Oscar Haught 5105 (US). Haught records that only one plant was seen.

6. *Macrocarpaea stenophylla* Gilg

The third collection of this localized Peruvian species was made in dry sandy soil, on Cerro de Fraijaco (Huau-Huni), northeast of Tamba de Ventilla, 3200-3400 meters ele., Dept. Amazonas, Peru, July 7, 1948, F. W. Pennell 15,861 (PH). Dr. Pennell records the shrub as having "corollas pale yellow (baryta yellow)." All three collections studied are morphologically very uniform.

7. *Macrocarpaea subcaudata* Ewan, Contr. U. S. Nat. Herb. 29:224. 1948.

⁸Contr. U. S. Nat. Herb. 29:227. 1948.

Among the unsorted sheets of Gentianaceae at the New York Botanical Garden Herbarium there turned up the second sheet of this species, an isotype, which supports the characters previously employed in distinguishing the species of Costa Rica. The label bore no additional information as to the origin of the specimen over my conjectural remarks.

8. *Macrocarpaea glaziovii* Gilg, Bot. Jahrb. Engler 22:335. 1897.

This Brazilian species was discussed in the supplement to my revision of the genus *Macrocarpaea*⁹ as being a "doubtful species," suggesting an affinity with *M. rubra* Malme but differing in certain particulars enumerated there. Subsequently I found J. F. Macbride had photographed the type at the Botanical Museum of Copenhagen and the Chicago Museum of Natural History had issued the print as their number 22740 in the series of photographs of type specimens. Now through the cooperation of Dr. O. Hagerup of the Copenhagen Museum I have been able to study this type, which consists of two sheets of the same collection overlapped by Macbride for purposes of photographing.

Macrocarpaea glaziovii is a distinct species of the section Tabacifoliae, differing from the two other Brazilian species, *M. rubra* and *M. obtusifolia* but more closely related to the latter species. *Macrocarpaea glaziovii* would be sought in my key (*op. cit.* 216-219) near *M. obtusifolia*, from which it differs in having the usually shorter smaller corollas borne erect but particularly in having the calyx subglabrous with only a few scattered black hairs; near *M. corymbosa*, from which it differs in having the calyx tube truncate or broadly cupulate at the base; and near *M. pachystyla*, from which it differs in having the panicle more congested, and from all of these species *M. glaziovii* differs in its broadly goblet-shaped corolla with its large open throat, 2 cm. wide, while the corolla tube itself is short, only 2.5 cm. long, and the ovate corolla lobes 8-10 mm. long, tending to be paler toward the margins. The calyx is deeply divided in the manner of *Macrocarpaea guttifera* but it does not otherwise resemble that Amazonian species.

The type of *Macrocarpaea glaziovii* bears a field ticket in pencil in Glaziou's hand [*teste* O. Hagerup] reading "Tijuca, 7 O[cto]bre 1871," which then may be construed as the type locality. This locality in the State of Rio de Janeiro was visited by the English collector, George Gardner, in 1836.

⁹Contr. U. S. Nat. Herb. 29:248. 1948.

PROCEEDINGS
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A NEW BLACKBIRD (AVES) FROM WESTERN CHINA

BY H. G. DEIGNAN*

Examination of the series of blackbirds, *Turdus merula* subsp., in the collection of the United States National Museum, has shown the existence of a hitherto unrecognized race in the western Chinese province of Szechwan. In honor of my friend Arthur de Carle Sowerby, the well-known naturalist-explorer of China, I propose to call it

Turdus merula sowerbyi, subsp. nov.

Type.—United States National Museum No. 277524, adult [male], collected at Loshan [Kiating], Szechwan Province, China, on March 2, 1924, by David C. Graham.

Diagnosis.—The adult male of *T. m. sowerbyi* has the upper parts a uniform, unglossed sooty black (deeper and with less suggestion of brownish suffusion than appears in the same sex of *T. m. mandarinus*), and the under parts a deep brownish sooty black (much darker than the grayish-brownish soot color of these parts in *mandarinus*).

The adult female of *sowerbyi* has the upper parts a brownish sooty black (deeper and with less brownish suffusion than is seen in the same sex of *mandarinus*), and the under parts a dark rust-washed sooty brown (much darker than the rust-washed grayish-brownish soot color of these parts in *mandarinus*).

Specimens examined.—*Turdus m. mandarinus*: 9 males, 8 females; *T. m. sowerbyi*: 7 males, 7 females.

Remarks.—The only name that needed to be considered as possibly applicable to the Szechwan bird is *Turdus wulsini* Riley (Proc. Biol. Soc. Washington, vol. 38, Nov. 13, 1925, p. 115), based upon a blackbird from Hingi [Hwangtsaopa], in extreme southwestern Kweichow Province. The type specimen of *Turdus wulsini* has proved to be a subadult of *Turdus m. mandarinus*.

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PROCEEDINGS
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ON TWO NEW COLOBOGNATH MILLIPEDS AND RECORDS OF
SOME ESTABLISHED SPECIES FROM EAST OF THE ROCKY
MOUNTAINS

BY NELL B. CAUSEY

Fayetteville, Arkansas

The two species of colobognath millipeds described here raise the number known from east of the Rocky Mountains to nine, representing five genera (Cook and Loomis 1928, Loomis 1936, Chamberlin 1940, Chamberlin and Mulaik 1941). The states of Louisiana, Mississippi, and Florida, from which no collections are known, should yield interesting specimens of this order, which is predominately tropical in its distribution. It is also imperfectly known in the New England States.

Type specimens of *Polyzonium bikermanni* will be deposited at the Philadelphia Academy of Natural History; those of *P. mutabile* are in the permanent collection of the Illinois Natural History Survey. Where no collector is mentioned, collection was by the author. I am grateful to Dr. M. W. Sanderson for the use of the specimens from the Illinois Natural History Survey.

Family Polyzoniidae

Genus *Polyzonium* Brandt

This genus, represented also in Europe by several species, is known from as far north as New Hampshire and southwest into Arkansas; it doubtless will be found in most of the states east of the Rocky Mountains.

Polyzonium bivirgatum (Wood 1864)

Polyzonium bivirgatum (Wood). Cook and Loomis, 1928, Proc. U. S. Nat. Mus., vol. 72, art. 18, p. 18, fig. 4. This paper contains a synonymy.

Polyzonium rosalbum (Cope). Williams and Hefner, 1928, Ohio Biol. Survey, Bull. 18, p. 104, figs. 7 and 8.

The only published figure of the gonopods of *P. bivirgatum* is that of Williams and Hefner; it corresponds with my specimens from Cumberland Falls State Park, Kentucky, and Durham, North Carolina, except that there are six articles in each of the anterior gonopods and five in the posterior, and the several straight setae about midway on the seminal blade and the setae on the other articles of the gonopods are omitted. The specific distinction in the anterior gonopods is the spatulate coxal process and the attenuated seminal blade with the opening of the seminal canal subterminal. In immature specimens the opening of the canal is terminal, the coxal process is conical, and the number of body segments is presumably 33 or under.

Wood (1864, 1865) reported the color of specimens believed to be from Georgia as "brown, with a fuscous stripe on each side . . . the

feet are dark-colored." Cope (1870) found Tennessee specimens a delicate rose, shading to whitish at one end and orange at the other; McNeill's (1887) Indiana specimens were light brown or parchment color, while the Ohio specimens of Williams and Hefner were yellowish white to pale rose. My specimens from Tennessee, Kentucky, and North Carolina have been a delicate rose color, except for the light brown antennae, when collected. Wood and probably McNeill described the color of preserved material. It is very doubtful that the Michigan specimen that Bollman (1895, p. 95) described as having "antennae almost black; face and legs mottled with a purplish shade" is *bivirgatum*; these colors more nearly resemble those of *mutabile*, which I know only from preserved material.

The repugnatorial secretions have a strong camphor-like odor.

The extent of the range of *bivirgatum* is unknown; it doubtless has been confused with the two following species in some earlier publications.

***Polyzonium bikermani*, sp. nov. (Fig. 1)**

This species closely resembles *bivirgatum* in the shape and size of the body and in the shape of the coxal process of the male gonopods; the two can be distinguished by differences in color, odor of the repugnatorial secretions, the shape of the seminal blade, and the position of the opening of the seminal canal.

Male holotype. Color of dorsum cream or very light tan, lighter along lateral margins; legs and venter lighter; antennae and head light tan. Four ocelli in each of the two rows, both rows set in black, comma-shaped areas which are not confluent medially and are partly covered but visible through the tergite of the first segment. Repugnatorial secretions with but a slight trace of the camphor odor that is so noticeable in the secretions of *bivirgatum*.

Each anterior gonopod consists of five articles. The first or coxal article (Fig. 1, I), scarcely visible from the posterior view, from the anterior is seen to be broad, short, and prolonged mesially into a spatulate lobe or process (c p) which bears several straight, subterminal setae. The trochanter (II), also visible from the anterior view, is narrow and has a row of 6 or 7 setae across it. The prefemur (III), the largest article of the gonopod, is visible from both anterior and posterior views; about 10 setae are on its crest. The femur (IV), slightly smaller than the prefemur, and the postfemur (V), smaller than the femur, both have several setae on the crest and are visible mainly from the posterior view of the gonopod. The tarsal article or seminal blade (VI), slightly shorter and thicker than in *bivirgatum*, is of almost uniform width throughout its length; distally it is excised, the seminal canal opening in the middle of the excision; a few straight setae are about midway of its length. The posterior gonopods appear to be like those of other species studied. There are four setae on each of the two sternal horns adjacent to the anterior gonopods; in *bivirgatum* each horn has one seta.

Width 1.7 mm., *length* about 12 mm., 40 segments, 4 of them legless.

Female allotype 41 segments; similar in size and appearance to the male.

Locality.—Devil's Den State Park, Washington Co., Arkansas, Sept. 25, 1949; 21 specimens of different ages.

Other collections have been made throughout the year in mixed decidu-

ous woods in Washington, Benton, and Carroll counties, Arkansas. This fairly abundant species is usually collected from slightly damp leaf litter; it rarely occurs under logs or rocks nor is it found in conspicuous aggregations. This is in marked contrast to another colobognath milliped, *Brachyeybe lecontii*, which occasionally occurs at the same collecting site, but prefers the lower surface of decaying stumps or logs, where it sometimes is found in brilliant rose aggregations of 100 or more individuals of various ages.

It is a pleasure to name this species for Mr. J. J. Bikerman.

Polyzonium mutabile, sp. nov. (Fig. 2)

Distinguished from other species of the genus by the shorter and broader coxal process of the anterior gonopods of the male.

Male holotype.—Color in life unknown; in alcohol the dorsum is brownish yellow, paler posteriorly and along the lateral margins, with inconspicuous narrow brown bands on the posterior margins of the tergites and along the mid-dorsal line; legs and venter cream. Antennae medium brown, a narrow dark brown band on the margin of each article. Four black ocelli in each of the two rows, both rows set on black, comma-shaped areas which are not confluent medially, and which are about half covered by the tergite of the first segment. Odor of repugnatorial secretions unknown.

Posterior gonopods with usual appearance. Anterior gonopods (Fig. 2) more inflated than in the other two species of the genus, but the number and general proportions of the articles is similar. Coxal process (cp) bluntly rounded, the margin thickened medially and distally in such a way that the process almost appears uncinat; on its mesial surface are about 20 very short uncinat setae. Seminal blade (VI) distally truncated, flattened, slightly bent laterad; seminal canal (sc) opens distally. Setae distributed as shown in figure 2. Five or six setae on each of the two sternal horns adjacent to the anterior gonopods.

Width 1.9 mm., *length* about 13 mm., 30 segments, 2 of them legless.

Locality.—Winthrop Harbor, Illinois; 18 specimens, 4 of them adult males, were collected March 17, 1933, by T. H. Frison.

Additional specimens in the collections of the Illinois Natural History Survey are from the following places in Illinois: Starved Rock State Park, White Pines State Park, Mt. Carroll, Magnolia, Rocky Branch, and Dolson. The largest number of segments, 41, was found in a female.

Key to Species of *Polyzonium* Based on Gonopods of Adult Males

- 1 (4) Coxal process of anterior gonopods spatulate, longer than wide, the setae straight and relatively long 2
- 2 (3) Seminal canal opens subterminally on attenuated seminal blade
bivirgatum (Wood)
- 3 (2) Seminal canal opens in middle of an excision in end of seminal blade, which is but slightly attenuated *bikermani* Causey
- 4 (1) Coxal process of gonopod wider than long, margin thickened, about 20 very short, uncinat setae on its mesial surface
mutabile Causey

Family Andrognathidae

Genus *Brachyeybe* Wood

Brachyeybe lecontii Wood

Records.—Arkansas: Carroll, Marion, Newton, Searcy, and Washington Counties.

* Illinois: Pulaski Co., P. W. Smith, June 1, 1949.

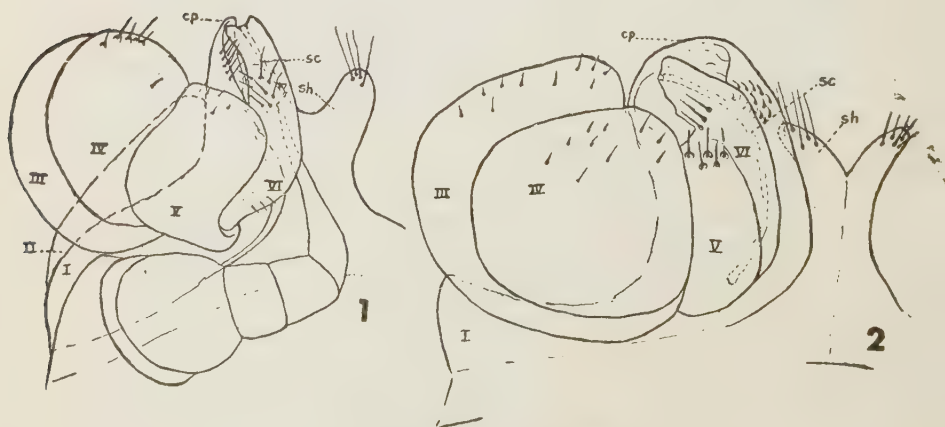
Kentucky: Whitley Co.

Brachycybe petasata Loomis

Records.—North Carolina: Cherokee, Jackson, and Swain Counties.

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EXPLANATION OF FIGURES

Plate XII

Fig. 1. *Polyzonium bikermani*. Right gonopods and sternal horns, posterior view, male paratype. Articles of anterior gonopod, I-VI; s c, seminal canal; c p, coxal process; s h, sternal horns.

Fig. 2. *Polyzonium mutabile*. Right anterior gonopod and sternal horns, posterior view, male holotype.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW HALOBATINID FROM MEXICO
(HEMIPTERA; GERRIDAE)

BY C. J. DRAKE AND F. C. HOTTES

The present paper gives distributional records of the genus *Telmatometra* Bergroth in Mexico and the description of a new water-strider belonging to the genus *Trepobates* Uhler, which was found in large numbers breeding in a salt-water lagoon near Acapulco. The type of the new species is in the collection of C. J. Drake.

Telmatometra whitei Bergroth

Telmatometra whitei Bergroth, Ohio Nat., 7:374. 1908.

Telmatometra whitei Drake and Harris, Rev. Ent., 7:360, fig. 2a. 1937;
Journ. Sci. Iowa St. Col., 15: 238. 1941.

Typical specimens of *T. whitei* were taken in a small stream several miles south of Tehautepec, July 23, 1951, by the authors. It was originally described from Guatemala, and published records as well as collections show that the insect is widely disseminated in Central America and the West Indies.

Telmatometra whitei ujhelyii Esaki

Telmatometra ujhelyii Esaki, Ann. Mus. Nat. Hung., 23:133, fig. 4.

Telmatometra whitei ujhelyii Drake and Harris, Journ. Sci. Iowa State Col., 15: 238. 1941.

Variety *ujhelyii* seems to be more widely distributed in Mexico than the typical form. Specimens are at hand from Tehautepec, July 23, 1951; Puebla, July 20, 1951; Alvarado, July 28, 1951; and Cuidad Valles, Aug. 8, 1951, all collected by the authors. In common with many other species of halobatinids, the color markings of the pronotum vary sometimes considerably in specimens from the same as well as different localities.

Trepobates vazquezae, sp. new

Apterous form: Moderately large, robust, orange-brown with black and dark brown markings; pubescence blackish, semi-reclining; male elongate-ovate, the female stouter and broadly ovate.

Size: Length, 3.70 mm. (male), 4.00 mm. (female); width, 1.60 mm. (male), 1.90 mm. (female).

Head: Width across eyes, 1.08 mm.; interocular space approximately twice the width of an eye. Eyes large, dark reddish brown, converging anteriorly, posteriorly projecting a little along the sides of the pronotum, viewed from lateral aspect quite large and almost circular in outline. Head orange-brown with a narrow border near each eye and sometimes a median longitudinal streak as well as a patch in front black; sides and beneath pale testaceous. Rostrum brownish black with basal seg-

ment testaceous, the last two segments beneath clothed with whitish hairs. Antennae long, slender, shortly pilose, the pilosity on third and fourth segments beneath longer; segment I longest, stoutest, slightly bowed, slightly enlarged apically, becoming testaceous basally; formula—I, 86; II, 42; III, 48; IV, 52 (male), I, 70; II, 40; III, 48; IV, 52 (female).

Thorax: Pronotum short, nearly twice as wide as long, with three broad longitudinal stripes (median and one on each side) black, the median and sometimes the lateral ones terminating a little before reaching the hind margin. Mesonotum very large, truncate behind, mostly orange-brown, with three broad basal longitudinal stripes black. Metanotum short, black with a large orange patch behind on each side. Thorax beneath testaceous, sometimes with a little brownish tinge.

Legs: Largely black with orange-brown markings, clothed with short pale hairs. Anterior legs with coxae and trochanters testaceous, the latter sometimes darkened above; femora moderately bowed, concave beneath with a patch of short brown hairs before apex, slowly enlarged apically, not noticeably constricted above before apex, there with a broad orange brown band, the basal part above and most of surface on underside testaceous of brownish; tibiae black with apical two-fifths orange-brown; tarsi entirely black. Middle legs very long, coxae and trochanters largely orange-brown; femora moderately stout, with a broad apical band and a narrow basal orange-brown stripe on each side, beneath densely clothed with moderately long dark hairs which are not quite as long as the diameter of the segment at their respective points of origin, the tips of the long hairs slightly recurved; tibiae black, very long, slender not quite twice as long as femora (300:172); tarsi entirely black, segment I longer than II (50:38). Hind legs slender, shorter than intermediate pair, almost entirely black, the femora with a narrow longitudinal orange-brown stripe at the base; femora more than twice as long as tibiae (110:50); tarsi entirely black, segment I longer than II (54:30); coxal plates above sometimes with a black patch.

Abdomen: Tergites black with the last one, two or sometimes three orange-brown, the black segments usually bluish pruinose. Connexiva above brown-black with a large orange spot in the middle of each segment, not produced posteriorly, moderately hairy but without long hairs or tufts of long hairs. Abdomen beneath testaceous, clothed with short hairs.

Male: Last ventrite longer than the two preceding segments which are longitudinally ridged on median line. Hind margin of venter and genital segments without long hairs. Genital segments testaceous, the first slightly narrowed posteriorly; parameres curved apically.

Female: Distinctly broader than male. Color and markings similar and as variable as in male, Last segment of venter less than twice as long as the preceding.

Winged form: Pronotum very large, five-sided with apex behind rounded, orange-brown with black markings similar to those in apterous form (black median stripe usually constricted in front, there sometimes with a short median orange stripe in middle of black stripe). Hemelytra long, extending considerably beyond apex of abdomen, brownish black, with short golden hairs on median and outer nervure and also some on breaking suture; length, 3.50 mm., and base to breaking suture, 1.16 mm.

Type (apterous male), *allotype* (apterous female) and many *paratypes* (alate, apterous and deälated males and females), taken in a salt water lagoon, Acapulco, Mexico, Aug. 3, 1951, C. J. Drake and F. C. Hottes. Named in honor of Doctora Lenora Vazquez, Entomologist in charge of the National Insect Collection, Mexico City, Mexico.

The orange-brown color, pattern of black markings, absence of long hairs on genital segments and shape of male parameres differentiate at once the new species from its congeners.

Numerous other species of water-striders were collected along with *T. vazquezae* in the salt water lagoon near Acapulco. Biotic conditions, however, were not equally favorable for the multiplication of all of the different species. Based upon the number of individuals, *T. vazquezae* was by far the dominant form; it was present almost everywhere in the open water, including apterous and alate individuals of both sexes as well as nymphs in various stages of development. Deälated males and females were also abundant.

In favorable habitats near the shore, *T. vazquezae* occurred in large schools of several hundred individuals that were moving about. Here and there, in the open water of the lagoon, some individuals were standing and resting idly, or drifting passively with the air currents; others were gracefully cruising about in quest of prey. When disturbed, they suddenly leap and bound swiftly away by means of their long legs to make their escape.

Taken in the open water along with *T. vazquezae* were *Trepobates Taylori* (Kirk.), *T. trepidus* D. & H., *Metrobates denticornis* (Champ.), *Limnogonus guerini* (L. & S.), and an undescribed species of *Rheumatobates*. Near the shore, often under grasses or other vegetation overhanging the edge of the water, specimens were collected of *Microvelia hinei* Drake, *M. albonotata* Champ., *M. robusta* Uhler, *Velia brachalis* Stal, *Merragata hebroides* B.-White and a new species of *Hydrometra*. Several specimens were also taken of the cosmopolitan *Mesovelia mulsanti* B.-White. Of the above water-striders, *T. vazquezae* was the only species not taken in standing or running fresh water in the vicinity of the salt water lagoon.

PROCEEDINGS
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A NEW JUNIPER AHPID FROM WESTERN COLORADO

By F. C. HOTTES

The new species described here was collected on *Juniperus utahensis* growing on the Colorado National Monument near Grand Junction, Colorado.

Cinara wabhaka n. sp.

Apterous viviparous female:

Size and general color.—Average length from vertex to tip of anal plate 1.63mm. Range in size from 1.57-1.78mm. Width of head through eyes .51-.57mm. Color of head, thorax and abdomen dark brown. Thorax with just a suggestion of two dusky lateral stripes. Mounted specimens show the thorax with darker irregular shaped spots arranged in transverse rows. Similar spots are found in two transverse rows on the first two abdominal segments. Smaller and more rounded spots are arranged in two rows on each side of the remainder of the abdomen. Abdominal spiracles surrounded by small brownish spots. Spots on thorax and dorsum of abdomen suggestive of wax glands, but there is no powder or pulverulent matter present, the entire body presenting a highly polished appearance. First two antennal segments concolorous with head or slightly dusky. Antennal segments three, four and base of five pale, remainder of antennae dusky. Femora shading from tan to brown with apical regions darker. Tibiae pale except for apical regions which are concolorous with tarsi, which are dusky. Cornicles dusky, cauda and anal plate, and band just anterior to cauda the same.

Head and appendages.—Proportional lengths of antennal segments as follows: III .24-.28, most common length .27mm., IV .10-.11, most common length .11mm., V .128-.143mm. always longer than IV. VI .042-.057mm + .028mm. Secondary sensoria distributed as follows: III none, four none, five one. The primary sensorium on six large, round, free from hair ring with two or three marginal sensoria at the side, these are not always easily seen. The unguis is rather thick and stubby. Hair on antennae exceedingly sparse, fine and short, that on third segment being considerably less than half width of segment in length. Ocular tubercles present, but poorly developed. Head with a median suture. Hair on head exceedingly sparse, fine and even shorter than hair on antennae, not always sharp pointed. Vertex and anterior margin of head often free from hair. Rostrum as a rule attaining cornicles.

Thorax.—Length of hind tibiae varying from .958-1.07mm. Hind tarsi .243mm. in length. First segment of hind tarsus with about nine hair, on inner side, none on outer. Outer surface of hind tibiae with a few widely scattered fine short hair, hair on inner surface of hind tibiae not numerous and considerably shorter than width of tibiae.

Abdomen.—Base of cornicles small in comparison to diameter of rim, varying from .10-.12mm. Base of cornicles almost free from hair. Hair when present never more than six and confined for the most part to extreme edge of base. It is common for a cornicle to have only two

or three hair. Hair on cornicles longer than that on dorsum of abdomen. Hair on abdomen with the exception of that on anal plate and cauda very sparse, variable in length, but for the most part very short and not always sharp pointed. Hair on cauda and anal plate long, rather fine, present in moderate amount. The cauda is rounded but rather narrow.

Oviparous female:

In most respects this form is similar to that of the apterous viviparous female. Length varying from 1.781-1.85mm. Width across eyes .54-.60mm. Third antennal segment .114-.157mm. Fourth antennal segment varying from .114-.143mm. Fifth antennal segment varying from .43-.157mm. Sixth antennal segment varying from .042 + .028mm.-.042 + .042mm. Hind tibiae 1.11mm. in length. Hind tarsi .248mm. long. Hind tibiae swollen and rather bumpy in middle region. Sensoria rather tuberculate and difficult to see because of lack of color in this region of tibiae. Hair on tibiae more abundant and longer than that found on tibiae of apterous viviparous female.

Holotype apterous viviparous female Sept. 9, 1951. Morphotype oviparous female Oct. 2, 1951. Holotype and morphotype deposited in the United States National Museum. Paratypes taken on following dates: Sept. 9, 18, 23, and Oct. 2, 1951. On *Juniperus utahensis*. This species was only located once in nature although much time was spent in trying to locate other colonies. *Cinara wahhaka* feeds on the small green twigs (leaves) of Juniper. It appears to be closely allied to *Cinara burrilli* (Wilson), Canad. Ent. 51, p. 42, 1919, from which it differs in size, length and amount of hair, size of cornicles, and much fewer hair on cornicles and perhaps in color and lack of pulverulence.

Cinara burrilli (Wilson)

Through the kind and much appreciated cooperation of Prof. M. A. Palmer and Dr. G. F. Knowlton I have been enabled to study some of the original material of this species collected by Prof. G. Burrill. I question if Wilson saw these specimens at the time he described the species, but they unquestionably form a part of the cotype material. Wilson's original description was based in part on notes taken by Burrill in the field. There is much in the original description that does not fit the specimens at hand and I am almost convinced that the description was based on two species. I have not seen the type, but Prof. Palmer has sent me measurements taken from it, which indicate that it does not differ from the cotype material seen by me. The apterous viviparous females differ from the description in the following respects: They are smaller, being about 2.5mm. long, not 3mm. The third antennal segment is free from secondary sensoria, and varies in length from .30-.35mm., not .42mm. The base of the cornicles is not as small as the description leads one to suspect. The hair are not short, neither are they inconspicuous. I suspect that the color was not black.

Wilson quotes Burrill as saying that the species feeds on the bark on the underside of the limbs. The slides labeled by Burrill state that the specimens were "taken on the upper twigs." The color is described as "black with pruinose patches which produce a calico effect." It is further stated that they greatly resemble the bark in color. The mounted specimens suggest that the color was something other than black, and I question if the specimens could be black and resemble the bark, even if the pruinose condition were present, and still live on the twigs. Can it be that Burrill took his color and habitat notes from the species described by Gillette and Palmer in 1924 and named *Lachnus sabiniae*?

PROCEEDINGS
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NOTES ON THE GENUS *RHEUMATOBATES* BERGROTH
(Hemiptera: Heteroptera)

BY C. J. DRAKE AND F. C. HOTTES

This paper includes the descriptions of three new species of *Rheumatobates* Bergroth from Mexico, notes on a few other species and makes *R. crinitus* Herring a variety of *R. vegatus* Drake and Harris. The types of the new species are in the collection of C. J. Drake; paratypes in the collections of both authors. A list of species with distributional records is also appended.

Rheumatobates petilus, sp. new

Apterous form: Small, a little larger than *R. minutus* Hungerford, brownish black with markings testaceous or whitish testaceous. Antennae and middle and hind legs straight, unmodified and simple in both sexes.

Size: Length, 2.30 mm. (male), 2.55 mm. (female); width, 0.90 mm. (male), 1.00 mm. (female).

Head: Width across eyes, 0.80 mm.; interocular space, 0.45 mm. Head black with a very wide V-shaped mark at its base, with usual long dark hairs on each side, also with the two long dark hairs growing out of the hind part of each eye; median line impressed, black, pitted. Eyes large, reddish brown. Rostrum fuscous-brown, shining, with apical segment black, extending a little beyond prosternum. Antennae moderately long, slender, straight, brownish black with basal segment pale testaceous, shortly densely pilose, with usual very long bristly hairs on third segment, also with a few short stiff hairs on second and fourth segments; segments I a little bowed and stouter than the others; formula—I, 30; II, 12; III, 21; IV, 26.

Thorax: Pronotum very short, dark fuscous with the median part between the posterior projections testaceous. Mesonotum large, a little wider than long (50:68), blackish fuscous with median testaceous stripe usually not attaining front margin; sides above acetabula whitish yellow with lower edge almost straight. Metanotum short, blackish. Head, thorax and abdomen above densely clothed with short, recumbent, grayish yellow pubescence; pubescence on ventral surface largely testaceous.

Abdomen: Black-fuscous with hind margin of last tergite brownish; connexiva above usually with some testaceous markings, beneath largely testaceous.

Male: Anterior femora unusually strongly incrassate, brownish black with base above and ventral surface pale testaceous, beneath armed with a sparse row of black spines; tibiae and tarsi black-fuscous, the former hairy above. Middle legs very long, slender, without long hairs, brownish black with coxae and trochanters testaceous; femora stouter and longer

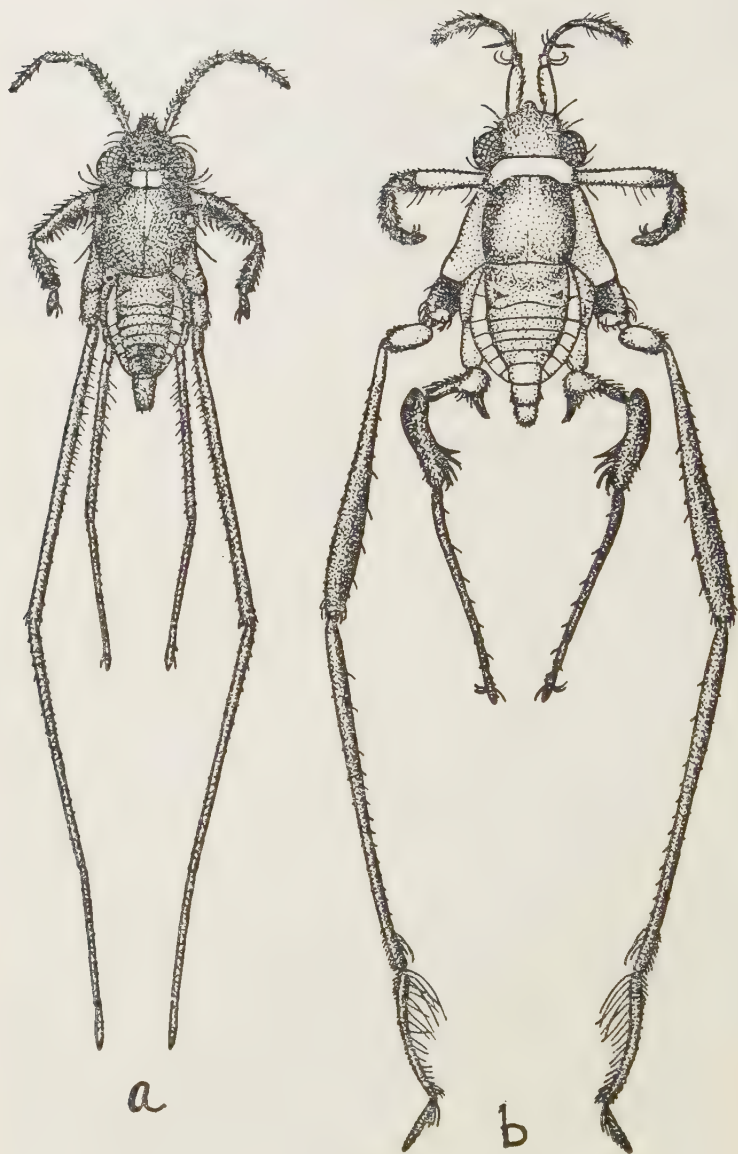


PLATE XIII

Reummotobates—a. *R. clavis*, Drake and Harris; b. *R. crassifemur*, Esaki

than tibiae (140:110). Hind legs much shorter than intermediate pair, brownish black becoming paler basally, slender, with hairs on outside of basal two-fifths of femora slightly longer than the width of the segment; femora much longer than tibiae (110:55); tarsi very short. Last segment of venter testaceous, as long as the two preceding; first genital segment beneath testaceous, flattended, almost quadrate in outline, feebly widely emarginate behind, above convex and rounded behind; second segment beneath testaceous and blackish above.

Female: Front legs not strongly swollen, dark brownish with femora largely testaceous; femore beneath with two sparse rows of long divergent hairs, which are slender and dark brown in color. Middle legs much longer than hind pair; femora within (also basally on the outside) beset with a sparse row of moderately long dark bristly hairs that gradually become shorter apically; femora longer than tibiae (110:60). Femora of hind legs beset with a little longer and more numerous bristly hairs. Genital segment black-brown with broad median strip on basal part above and base beneath testaceous. Winged forms unknown.

Type (male), *allotype* (female) and two female *paratypes*, taken in a large fresh water pond, Acapulco, Mex., Aug. 3, 1951, C. J. Drake and F. C. Hottes. Two apterous males (teneral) were also taken in the salt water lagoon.

This species belong to the group of *Rheumatobates* Bergroth that have slender and straight antennae and both middle and hind pairs of legs straight and unmodified in the male. The color, markings, long first antennal segment and strongly swollen anterior femora distinguishes the male from its congeners; and the long first antennal segment and long bristly spine-like hairs separates the female. The genital segments are without long hairs in both sexes.

Rheumatobates vegatus Drake and Harris, Rev. Bras. Biol., 2(3):401. 1942.

This insect was originally described from an apterous male, taken on saline waters, Isle of Pines. Cuba. Two males and 3 females, all apterous, are now at hand from San Juan, Porto Rico, July 9-12, 1914. The female is similar in color and marking, but stouter than the male. Both sexes exhibit slight variation in size of color markings, and the hairs on the sides of the first genital segment of the male vary a little in numbers (perhaps some rubbed off in nature).

Rheumatobates vegatus crinitus Herring.

Rheumatobates crinitus Herring, Fla. Ent., 32(4):160-165, Pl. 1. 1949.

This species is reduced to a variety of *R. vegatus* D. & H. The small differences in color and hairs on first male genital segment fall within the range of variation in typical examples of *vegatus*. The middle legs tend to be a little longer in *R. crinitus* Herring than in *vegatus* (60:70), and these differences may prove not to be specific or constant. Herring (*loc. cit.*, pl. 1) has published an unusually fine illustration of *crinitus*.

Rheumatobates hungerfordi Wiley

Rheumatobates hungerfordi Wiley, Can. Ent., 1923, p. 202-205, 7 figs.

This striking species breeds in both standing and slowly flowing waters of streams. It was taken in large ponds, and near the banks in the

sluggish parts of streams in Mexico. Numerous specimens are at hand from Mexico (Cuidad Valles, July 20, 1950; Cuidad Victoria, July 29, 1951; Alvarado, July 29, 1951; Puebla, July 20, 1951, all collected by the authors). Many specimens are also at hand from several localities in New Mex., Ariz., Utah, and Tex.

Rheumatobates creaseri Hungerford

Rheumatobates creaseri Hungerford, Carn. Inst., Wash., Pub. No. 457, 1936.

Six specimens, Acapulco, Mex., Aug. 3, 1951, taken in a large fresh water pond, by the authors. The type series were collected in Yucatan, Mex. The middle legs, missing in type series, are described below.

Male: Middle pair of legs very long, black-fuscous with apical part of coxae and base of trochanters testaceous; femora distinctly bowed, somewhat compressed laterally, sharply incrassate above apically, bifid behind, above with a short fringe of long hairs just before the apex, ends truncate with tibiae attached to lower end, with a broadly flattened hook curved around between the bifid ends; tibiae very much slenderer, straight, with a few long hairs near the middle, subequal in length to femora (132:142); coxae very strongly swollen, nearly cylindrical in outline, scarcely longer than wide, twice as wide as base of trochanters, the latter very short and slightly thicker than base of femora.

The middle legs are rather similar in length, size, form and modifications to *E. citatus*, n. sp. However, the two species are very distinct and may be separated as indicated beneath the description of the latter.

Rheumatobates citatus, sp. new

Apterous male: Moderately large, velvety black with testaceous markings. Antennae strongly swollen and modified. Middle and hind legs long, modified.

Size: Length, 2.75 mm.; width, 1.25 mm.

Head: Width across eyes, 1.00 mm. Interocular space less than three times the width of an eye. Head velvety black, sometimes brownish behind, beneath testaceous. Antennae quite stout, clothed with short hairs, all segments modified, fuscous-black with the underside of first segment largely brownish testaceous, the apical third of third and basal two-thirds of fourth whitish testaceous; segment I stout, somewhat arcuate, very strongly incrassate from base almost to apex, compressed and flattened on inner side, with several very long hairs beneath at apical third fused so as to form a large, black, spine-like process which points obliquely downward and forward, upper surface with short hairs more numerous and a little longer just before the apex; II short, bead-like, a small bump beneath at the base, the long hairs on inner side at the base fused so as to form a spine-like structure which is about as long as segment is thick; III gradually narrowed apically, beneath concave and longitudinally excavated on distal half, subbasally widened and projected posteriorly so as to form a distinct subbasal lobate projection, the excavated part (not lobate process) whitish testaceous, on the inner side at the base with an extremely long spine-like structure formed by fused hairs, with some hairs on edges of lobate projection, a few of which are fused on inner side; IV tapering apically, denticulate beneath

towards the tip; formula—I, 55; II, 13; III, 27; IV, 17. Head and eyes with usual long dark hairs. Rostrum extending a little beyond prosternum, dark fuscous, shining, the second segment paler and clothed beneath with a sparse row of long hairs on each side.

Thorax: Pronotum short, whitish testaceous with sides brownish black. Anterior legs brownish black with femora (save apex), coxae and trochanters pale testaceous; femora beneath with a sparse row of six or seven long slender seta-like spines. Sternum and venter pale testaceous. Mesonotum large, wider at base than median length (90:70), velvety brown-black tinged with bluish, with a large discal patch testaceous. Intermediate legs very long, brownish black with coxae and trochanters beneath and a small spot on each above testaceous; coxae very strongly incrassate, cylindrical, subequal in width and length, with a small tuft of hairs near the middle on each side (sometimes a few of the hairs fused); trochanters very short, slightly thicker than the base of the femora; femora very long, distinctly bowed, feebly enlarged basally, very strongly enlarged before apex, there about three times as thick as at base and somewhat bifid, with tibiae attached to lower end, beneath densely clothed with very short hairs which are less than half of the diameter of segment; with a flat hook at middle curved around between bifid ends; tibiae slender, with a short dense fringe of bristly hairs on the dorsal side before the middle and a sparse row of shorter hairs on the opposite side of the middle, nearly as long as femora (168:172); tarsi long slender, the first segment three times as long as the second (100:32). Hind legs long, slender, much shorter than the middle pair, brownish black with coxae and trochanters mostly testaceous; coxae moderately incrassate, much thicker and scarcely longer than trochanters (12:11); femora long, slender, straight, from the basal third to apex beset with a sparse row of long dark hairs which are two to three times as long as the width of the segment; tibiae slender, moderately bowed, with a short row of very long hairs on the basal half of the dorsal surface, much longer than femora (92:160); tarsi short, slender, the basal segment longest (21:11).

Abdomen: Black with last four or five connexival segments and last tergite testaceous, beneath brownish with median part and last ventrite testaceous, the latter shallowly emarginate behind. Genital segments small, the last testaceous.

Wingless female: Slightly stouter than male, color and markings similar; connexival segments largely testaceous, third antennal segment with usual long bristly hairs; antennal formula—I, 11; II, 6; III, 12; IV, 13. Anterior femora almost wholly testaceous, with extremely long whitish hairs beneath and also a sparse row of very long bristle-like spines on inner side. Middle and hind legs brownish black, with a sparse row of short seta-like black spines which lean outwards; hind femora with much shorter spines. Length: middle femora, 0.90 mm. and tibiae, 0.75 mm.; hind femora, 0.70 mm. and tibiae, 0.40 mm. Winged forms unknown.

Type (male), *allotype* (female) and 3 male *paratypes*, taken in the quiet waters of a small stream, about 20 miles south of Tehauntepec, Mex., July 23, 1951, by the authors. One *paratype*, Acapulco, Mex., Aug. 3, 1951, taken by the authors.

Very similar in appearance and closely allied to *R. creaseri* Hunger-

ford, but easily differentiated from it by the differences in lengths and modifications of antennal segments and modifications of middle and hind legs. The first antennal segment is longer and the hind femora more densely fringed with brownish hairs that are about twice as long as the diameter of the segment; also the hind tibiae is a little bowed and beset above on basal half with a sparse row of extremely long dark hairs. In *R. creaseri*, the hind femora are much shorter than in *citatus* (86:160), and the tibiae are straight and do not bear long upright hairs.

***Rheumatobates mexicanus*, sp. new**

Apterous male: Large, black with prominent testaceous markings. Antennae and hind pairs of legs incrassate, greatly modified.

Size: Length, 2.25 mm.; width, 1.00 mm.

Head: Width across eyes, 0.80 mm. Head black, sometimes brownish at base, with usual long hairs on each side, beneath testaceous with some brownish tinge. Rostrum dark fuscous, shining, the second segment with several long hairs on ventral side. Eyes reddish brown, each with two long dark hairs a little in front of hind margin. Antennae brown-black with basal part of first segment testaceous, moderately stout; segment I moderately swollen, becoming thicker beneath from base for about two-fifths its length, there thickest, near the apical third beneath with some long dark hairs, several of which are fused so as to form a long stout spine-like structure which is directed antero-downwards, becoming slender and almost cylindrically anteriorly, broadly constricted before the apex; II very short, at the base beneath with the fused hairs pointed downwards; III moderately long, with some long dark stiff hairs beneath, strongly abruptly bent outwards near the base, on the lower side at the base with several long hairs fused so as to form an extremely long spine-like process, with a small bump before the apex on the outside, beneath near the apex with some long hairs fused, distinctly concave between bump and elbow on the outer surface; IV rather short, concave and flattened beneath with apical part turned downwards, and with a couple bristly hairs; formula—I, 45; II, 10; III, 28; IV, 14.

Thorax: pronotum short, blackish, with or without a diamond-shaped testaceous area, beneath entirely testaceous. Fore legs brown-black with coxae, trochanters, and almost entire femore (save apex) pale testaceous; femora beneath with a sparse row of very long slender seta-like spines brownish, also with three or four long bristly hairs on the outer edge of under surface at base; tibiae scarcely long than tarsi, with long dark bristly hairs beneath. Mesonotum large, wider than long, brownish black with the testaceous discal spot variable in size or even entirely absent, sometimes with anterior part of spot running narrowly to anterior border of mesonotum; beneath and most of the sides testaceous. Middle legs very long, moderately stout, straight, brownish black; coxae strongly swollen, testaceous, a little longer than wide; trochanters small, dark above, scarcely thicker than base of femora; femora extremely long, longer than tibiae (170:140), the outer surface on the apical half clothed with short hairs which are not as long as the width of the segment, the inner surface on apical two-fifths fringed with a little longer hairs, some of which before the apex are practically three times as long as the breadth of the segment; tibiae longer than tarsi (144:115), fringed on

the outside to a little beyond the middle with a row of hairs which are subequal in length to the width of the segment, clothed on outer and inner edges of basal half within with longer hairs, there in these rows with three small groups of hairs, the middle group much longer, several times as long as the diameter of the segment; first tarsal segment more than three times as long as the second (82:25). Hind legs brownish black with coxae and base of trochanters testaceous; coxae long, very strongly swollen, thickest near the base, thence arcuately narrowed apically, clothed with very short pubescence, longer than trochanters (42:30); trochanters moderately thick, with a few fine hairs beneath; femora rather short, very strongly bowed within, somewhat rounded basally, thence flattened and sort of scooped out on concave surface of apical fourth, clothed with numerous short hairs on entire dorsal surface, beneath just in front of small knob at base with long hairs fused so as to form a long dark spine-like process, another extremely long spine like-process (sometimes stiff hairs not very well fused and more or less separated) a little before the apex, near the upper edge about the middle with a peculiarly modied, flattened, hair-like formation; the femora much stouter and shorter than the tibiae (75:90); tibiae slender, moderately bowed, curved outward, rather densely clothed on the entire outer margin with dark hairs which are about as long as the width of the segment, clothed on the inside with shorter hairs which are nearly as long as breadth of the segment; tarsi short, the segments subequal (21:20).

Abdomen: Black-brown with the last two, three or even all of the connexival segments testaceous, last tergite also more or less testaceous; metanotum and abdomen with some bluish tinge. Venter testaceous with terminal segment roundly emarginate behind. First genital segment testaceous, the last blackish.

Apterous female: Slightly broader than male, similarly colored but with testaceous areas tending to be larger. Each connexival segment with a brown bristly hairs near the middle of the upper edge. Basal part of the genital segment above almost quadrate, dark or largely testaceous, sometimes dark with median stripe testaceous. Middle and hind legs long, slender, brownish black with coxae and trochanters testaceous; middle femora above with a sparse row of six or seven slender spines, which are rather evenly spaced, tilted outwards and nearly as long as the diameter of the segment, femora longer than tibiae (150:128); tarsi long, basal segment much longer than second (38:12); hind femora much longer than tibiae (110:64). Antennae brownish black with first segment almost wholly testaceous; III with usual long bristly hairs; formula—I, 20; II, 9; III, 20; IV, 25.

Winged form: Pronotum large with a large testaceous area, scarcely longer than wide (78:75). Hemelytra much longer than abdomen, dark fuscous with basal part of membrane up to deälatig suture whitish, nervures dark fuscous, the outer nervure ciliate on basal margin. Length, 2.75 mm.; to breaking suture, 1.00 mm.

Type (male) and *allotype* (female), both apterous, Acapulco, Mex., taken in a salt water lagoon, Aug. 3, 1951. *Paratypes:* Many specimens, apterous, macropterous and deälated males and females, taken with type; Aguascalientes, Mex., Aug. 5, 1950, and July 13, 1951; Puebla, July 20, 1951; Oaxaca, July 21, 1951; Tehautepec, July 28, 1951;

Mexico City, July 30, 1950; Ciudad Valles, July 14, 1950, and Aug. 8, 1951; Cuidad Victoria, July 14, 1950, and Aug. 8, 1951; Alvarado, July 28, 1951; and Veracruz, July 29, 1950; all collected in Mexico by the authors.

This species was taken in numbers in fresh water lakes or quiet parts of both small and large streams in all of the above localities, and in brackish salt water lagoons connect with the oceans at Veracruz, Alvarado, Tehauntepec, and Acapulco. Although the largest and most compact schools were found in large ponds or small lakes, the species was quite common in the quiet waters of the wide reaches of both large and small streams and salt water lagoons. The brackish waters in the large lagoon near Acapulco and the long deep lagoon or inland harbor at Alvarado were almost as salty as the ocean. At the latter place, a deep wide channel connected with the ocean so that large ships could enter and dock in the protected lagoon.

The shape and modifications of the antennae and two hind pairs of legs sets this species off from it congeners. It seems to be by far the commonest and most widely disseminated member of the genus in Mexico.

Rheumatobates crassifemur Esaki

Rheumatobates crassifemur Esaki, Ann. Mus. Nat. Hung., 23:149, fig. 9. 1926.

This species is widely disseminated in South America; specimens have been examined from Argentina, Paraguay, Brasil and Panama. It inhabits both fresh and saline waters.

In a deep brackish pool near the mouth of a small stream, not far from old Panama City, Panama, *R. crassifemur* was taken in numbers by C. J. Drake. The pool was supplied by fresh water from the stream during low tide, but at high tide it was completely submerged by tidal waters; high waves also over-ran the pool when the ocean was rough. Although many individuals were found here and there standing or cruising about on the quiet waters, very compact schools of apterous and alate adults and nymphs in various stages of development were dwelling in secluded haunts near the shore.

Other water-striders collected in the same pool were *R. minutus* Hungerford, *Trepobates taylori* (Kirkaldy) and *T. trepidus* Drake and Harris. Several species of halobatinids are able to breed and live on quiet brackish waters of pools, lagoon and more or less salty waters at the mouth of streams emptying into the seas. Two species, *R. clavis* Drake and Harris and *R. crassicornis* Esaki are figured.

LIST OF SPECIES

Genus *Rheumatobates* Bergroth, 1892

Hymenobates Uhler, 1894

Halobatopsis Ashmead, 1897

Type of genus, *R. rileyi* Bergroth, 1908

1. *bergrothi* Meinert, 1895.....Pan., V. I., Grenada.
2. *bonariensis* (Berg), 1898.....Arg., Braz., Uru., Para., Bol.
var. *wrighti* Drake and Harris, 1937.....With typical form.
3. *carvalhoi* Drake and Harris, 1944.....Braz.

4. *citatus* Drake and Hottes, 1951..... Mex.
5. *clanis* Drake and Harris, 1932..... Brit. Honduras.
6. *crassifemur* Esaki, 1936..... Arg., Braz., Para.
7. *creaseri* Hungerford, 1936..... Mex.
8. *esaki* Schroder, 1931..... Braz.
9. *hungerfordi* Wiley, 1923..... Mex., U. S. (Tex., Ariz., N. Mex., Ut.).
10. *imitator* (Uhler), 1894..... W. I.
bergrothi Barber, 1935
11. *klagei* Schroeder, 1931..... Braz.
12. *meinerti* Schroeder, 1931..... Haiti
13. *mexicanus* Drake and Hottes, 1951..... Mex.
14. *minutus* Hungerford, 1936..... Mex., Pan., Peru, Trinidad
var. flavidus Drake and Harris, 1942..... Peru
15. *petilus* Drake and Hottes, 1951..... Mex.
16. *praeposterus* Bergroth, 1908..... Guat.
17. *rileyi* Bergroth, 1908..... U. S. (East of Rocky Mts.)
beginini Ashemead, 1894
var. palosi Blatchley, 1926..... With typical form
18. *tenuipes* Meinert, 1895..... U. S. (East of Miss. R.)
19. *trulliger* Bergroth, 1915..... U. S. (East of Miss. R.)
20. *vegatus* Drake and Harris, 1942..... Cuba, Porto Rico.
var. crinitus Herring, 1949..... U. S. (Fla)

INDEX

New names are printed in heavy type.

A

acarius, Neosorex palustris	111
agilis, Lachnus	45
albibarbis, Sorex palustris	109, 110, 112
albomaculata, Centrolenella	37
Cochranella	35
albonotata, Microvelia	143
album, Trichopetalum	119
albus, Eudocimus	61
alia, Ofcokogona	117, 121, 124
Allosebates	129
alticola, Zenaida asiatica	83, 85, 86
amarus, Notropis hudsonius	95
Ameiurus nebulosus nebulosus	95
ammophilus, Geomys breviceps	57
Geomys bursarius	57
analostanus, Notropis	95
Anderson, William	
Life history of monarch butterfly (colored film)	ix
Anguilla bostoniensis	95
antioquiensis, Centrolenella	34, 36
Aphis	47, 50, 51
gossypii	48
illinoisensis	51
minutissima	50
nyctalis	52
plutapa	49, 50
tetrapteralis	50
(Wapuna) tahosalea	47
apicalis, Sceloporus spinosus	101, 103
Apomys	9
arizonica, Pinus	44
asiatica, Zenaida	85
Zenaida asiatica	83, 85, 86
Athene florensis	41
atkinsi, Lagopus mutus	63
atratus, Rhinichthys atratus	94
atromaculatus, Semotilus atromaculatus	94
attwateri, Geomys breviceps	57
Geomys bursarius	57
Atwood, Earl	ix
auritus, Leponis	95
australis, Pipistrellus hesperus	106

B

Brachycybe petasata	140
bairdii, Peromyscus maniculatus	25, 26, 27, 28, 29, 31
Baker, Rollin H. and Glass, Bryan P.	
The Taxonomic Status of the Pocket Gophers, Geomys bursarius and Geomys breviceps	55-58
Bamford, Ronald	
The Seventh International Botanical Congress at Stockholm	ix
Behle, Frederick M.	x
Behle, William	x

Behle, William H. and Selander, Robert K.	
A New Race of Dusky Grouse (Dendragapus obscurus) from the Great Basin	125-128
bergothi, Rheumatobates	154
Bignonia capreolata	59
bikermanni, Polyzonium	137, 138, 139, 140
bivirgatum, Polyzonium	137, 138, 139
Blake, S. F., reelected	
Treasurer	x
Exhibition of new edition of Gray's Manual of Botany	ix
Note on an unusual method of bathing of a song sparrow	x
Historical sketch of the centennial meetings of the Society	x
Boleosoma nigrum olmstedii	95
bonariensis, Rheumatobates	154
borbonica, Persia	59
bostoniensis, Anguilla	95
brachialis, Velia	143
Brachycybe lecontei	139
petasata	140
brasilianum, Glaucidium	66
Glaucidium brasilianum	67
brazensis, Geomys breviceps	57
Geomys bursarius	57
breviceps, Geomys	55, 56, 57
Geomys bursarius	57
Thaumapsylla	12, 13, 14, 15, 18, 21
brooksi, Sorex palustris	110
browallioides, Lisianthus	132, 133
Browallia	133
brownae, Tiganogona	124
Bryophyllum pinnatum	48
buckleyi, Cochranella	35
Hylella	36
Bump Gardner	
Upland game birds of the Near East	ix
burrilli, Cinara	146
bursarius, Geomys	55, 56
Geomys bursarius	56
Mus	56

C

cabrerae, Citellus spilosoma	106
cactorem, Glaucidium, brasilianum	67
caeruleopunctatus, Sceloporus spinosus	103
capreolata, Bignonia	59
carpio, Cyprinus	94
carvalhoi, Rheumatobates	154
Catostomus commersonnii commersonnii	94
Causey, Nell B.	
On Two New Colobognath Millipeds and Records of Some Established Species of the Rocky Mountains	137-140

New Genera and Species of Chrodeumoid Millipeds in the United States, and Notes on Some Estab- lished Species.	117-124	crassifemur, Rheumatobates	148, 154, 155
Centaureum	131	creaseri, Rheumatobates	150, 151, 155
pulchellum	131, 132	crinata, Microvelia	76
centaureum, Gentiana	33, 34, 37	crinitus, Rheumatobates	147, 149
Centrolene	33, 34, 36	Rheumatobates vegetus	149
geckoideum	33	crysoleucas, Notemigonus	
prosoblepon	33	crysoleucus	94
Centrolenella	33, 34, 36	Ctenocephalides felis orientis	
albomaculata	35, 37	cyaneus, Lepomis	95
antioquiensis	34, 36	Cyprinus carpio	94
colymbiphylus	37		
granulosa	34, 37		
spinosa	34, 37		
valerioi	36		
Centrolenidae	36		
Ceratophyllus robinsoni	11, 20		
Chace, Fenner A., Jr.	x		
Chamaeza campanisona ful- vescens	68		
huachamacarili	67, 68		
obscura	68		
venezuelana	68		
yavii	68		
chapmani, Phylloscartes chap- mani	69		
Chironia pulchella	131		
chrysops, Cochranella	35		
Cinara burrilli	146		
fornaculata	46		
juniperensis	46		
pulverulens	46		
tonaluca	45		
wahhaka	145, 146		
cinerus, Sorex cinereus	109		
citatus, Rheumatobates	150, 155		
Citellus spilosoma cabrerai	106		
pallascens	106		
spilosoma	106		
clanis, Rheumatobates	148, 155		
Clinostomus vandoisulus	94		
Cochanella	34		
albomaculata	35		
buckleyi	35		
chrysops	35		
colymbiphylus	34		
eurygnatha	34		
fleischmanni	34		
parambae	35		
parvula	35		
pulverata	35		
uranoscopa	35		
valerioi	35		
viridissima	35		
cognatus, Stivalius	13		
colymbiphylus, Cochranella	34		
colymbiphylus, Centrolenella	37		
commersonii, Catostomus com- mersonnii	94		
Conotyla	118		
specus	118		
cordifolia, Viguiera	52		
cordifolius, Penstemon	132		
cornutum, Trichopetalum	119		
cornutus, Notropis cornutus	95		
corporalis, Semotilus	94		
corymbosa, Macrocarpaea	134		
Cottam, Clarence			
Biological background of certain conservation prac- tices, especially waterfowl management	xi		
		D	
		Dalquest, Walter W.	
		Two New Mammals from Central Mexico	105-108
		Dasypsyllus gallinulae	13
		klossi	13
		Dayton, W. A., elected President	x
		Note on blue jays eating pin oak acorns	xi
		Deignan, H. G., reelected Vice President	x
		A New Race of the Hawk- owl, Ninox scutulata, from the Philippines	41-42
		A New Blackbird (Aves) from Western China	135-136
		de la Torre, Luis	x
		Dendragapus obscurus	125, 126, 127
		oreinus	125
		pallidus	125, 126, 127
		richardsonii	125, 126, 127
		denticornis, Metrobates	143
		disticum, Taxodium	59
		Drake, Carl J.	
		New Neogaeian Water-strid- ers (Hemiptera-veliidae)	75-82
		Drake, C. J. and Hottes, F. C.	
		A New Halobatinid from Mexico (Hemiptera; Gerri- dae)	141-144
		Notes on the Genus Rheu- matobates Bergroth (Hemi- ptera: Heteroptera)	147-158
		duidae, Glaucidium brasilianum	66, 67
		duidae, Phylloscartes chapmani	68, 69
		dutcheri, Geomys breviceps	55, 56, 57
		Geomys bursarius	56, 57
		Duvall, A. J., reelected Treasurer	x
		E	
		elongatus, Sebastodes	130
		Emerson, William K.	x
		Entosphenus lamottenii	94
		Eonycteris robusta	18
		Erimyzon oblongus oblongus	94
		Erythraea ramosissima	131
		erythrogaster, Natrix	60
		esaki, Rheumatobates	155
		Esox niger	95
		Eudocima	61
		Eudocimus	61
		Eudocimus albus	61
		ruber	61
		Eulachnus	45
		Eumeces laticeps	59, 60
		eurygnatha, Cochranella	34
		Hyla (Hylella)	36
		Ewan, Joseph	
		New Records of Neotropical Gentianaceae-II	131

F

<i>Felis bengalensis minuta</i>	19
Flagellopetalum	119
<i>stannardi</i>	117, 120, 122
<i>flavilineata</i> , <i>Tantilla</i>	98
<i>florensis</i> , <i>Athene</i>	41
<i>fleischmanni</i> , <i>Cochranella</i>	34
<i>Hylella</i>	36
<i>florensis</i> , <i>Ninox scutulata</i>	41
<i>fornacula</i> , <i>Cinara</i>	46
Fosberg, F. R.	
Exhibition of new botanical works	ix
Fiedmann, Herbert, elected Vice President	x
<i>fulvescens</i> , <i>Chamaeza campanisona</i>	68

G

Gabrielson, Ira N. and Lincoln, Frederick C.	
A New Race of <i>Ptarmigan</i> from Alaska	63-64
A New Alaskan Race of the Winter Wren	73-74
<i>gallinulae</i> , <i>Dasypsyllus</i>	13
<i>Gambusia affinis holbrooki</i>	95
<i>geckoideum</i> , <i>Centrolene</i>	33
<i>Gentiana centaurium</i>	131
<i>pulchella</i>	131
<i>Geomys breviceps</i>	55, 56, 57
<i>ammophilus</i>	57
<i>attwateri</i>	57
<i>brazensis</i>	57
<i>dutcheri</i>	55, 56, 57
<i>llanensis</i>	57
<i>ludemani</i>	58
<i>pratincolus</i>	57
<i>sagittalis</i>	57
<i>terricolus</i>	57
<i>bursarius</i>	55, 56
<i>ammophilus</i>	57
<i>attwateri</i>	57
<i>brazensis</i>	57
<i>breviceps</i>	57
<i>bursarius</i>	56, 57
<i>dutcheri</i>	56, 57
<i>hylaues</i>	56
<i>illinoensis</i>	56
<i>industrius</i>	57
<i>jugossicularis</i>	56
<i>levisagittalis</i>	56
<i>llanensis</i>	57
<i>ludemani</i>	58
<i>lutescens</i>	55, 56
<i>major</i>	55, 56, 57
<i>majuculus</i>	56
<i>pratincolus</i>	57
<i>sagittalis</i>	57
<i>terricolus</i>	57
<i>texensis</i>	57
<i>vinaceus</i>	56
<i>lutescens hylaues</i>	56
<i>jugossicularis</i>	57
<i>major</i>	57
<i>vinaceus</i>	56
<i>texensis</i>	57
<i>gibbosus</i> , <i>Leponis</i>	95
Gilmore, R. M., Member of Council	x
<i>gilmorei</i> , <i>Miopelodytes</i>	37
<i>glabra</i> , <i>Macrocarpaea</i>	133

Glass, Bryan P., and Baker, Rollin H.

The Taxonomic Status of the Pocket Gophers, <i>Geomys bursarius</i> and <i>Geomys brevipes</i>	55-58
<i>Glaucidium brasilianum</i>	66
<i>brasilianum</i>	67
<i>cactorem</i>	67
<i>duidae</i>	66, 67
<i>margaritae</i>	65, 67
<i>medianum</i>	66, 67
<i>nanum</i>	67
<i>olivaceum</i>	66, 67
<i>phaloenoides</i>	65, 66, 67
<i>ridgwayi</i>	67
<i>tucumanum</i>	67
<i>ucayalae</i>	67
<i>jardnii</i>	66
<i>glaziovii</i> , <i>Macrocarpaea</i>	134
<i>glover-alleni</i> , <i>Sorex palustris</i>	109, 110, 111, 112, 113
<i>gossypii</i> , <i>Aphis</i>	48
<i>granulosa</i> , <i>Centrolenella</i>	34, 37
<i>Guara</i>	61
<i>guerini</i> , <i>Limnogonus</i>	143
<i>guttofera</i> , <i>Macrocarpaea</i>	134
<i>Gymnodactylus marmoratus</i>	91
<i>rubidus</i>	91
<i>serpensinsula</i>	91

H

<i>hambletoni</i> , <i>Microvelia</i>	77
Harper, Francis	
Wildlife on the Barren Grounds of Keewatin	x
<i>hebroides</i> , <i>Merragata</i>	143
<i>Heinke</i> , <i>Adelle</i>	ix
<i>Helicolenus</i>	
<i>hesperus</i> , <i>Pipistrellus</i>	105, 106, 107
<i>hinei</i> , <i>Microvelia</i>	143
<i>Hispanicus</i>	130
Hoffman, I. N.	
Note of a visit to Barro Colorado Island	ix
<i>holbrookii</i> , <i>Gambusia affinis</i>	95
<i>Hoogstraalia</i>	20
<i>turdella</i>	20
Hottes, F. C.	
A New Juniper Aphid from Western Colorado	145-146
Hottes, F. C. and Drake, C. J.	
A New Halobatinid from Mexico (Hemiptera; Geridae)	141-144
Hottes, F. C. and Wehrle, L. P.	
Two New Species of Lachnini (Aphididae) from Arizona	43-46
Arizona Anorididae	47-54
Howden, Henry F. and Manusueti, Romeo	
Fishes of the Tributaries of the Anacostia River, Maryland.	93-96
<i>huachamacarill</i> , <i>Chamaeza campanisona</i>	67-68
Hubbs, Carl L.	
Allosebastes, New Subgenus for <i>Sebastes sinensis</i> , Scorpaenid Fish of the Gulf of California	129-130
<i>hungerfordi</i> , <i>Rheumatobates</i>	149, 155
<i>Hybognathus nuchalis regius</i>	95
<i>hydrobadistes</i> , <i>Sorex palustris</i>	110
<i>Hydrometra</i>	143

Hyla	35	Note on woodcock nesting in January in Louisiana	ix
(Hylella) eurignatha	36	Note on starlings bathing in cold weather	ix
uranoscopa	36	Reminiscences of service as Treasurer for 25 years	x
ocellifera	33, 36	Lincoln, Frederick C. and Gabrielson, Ira N.	
parabambae	36	A New Race of Ptarmigan from Alaska	63-64
prosoblepon	33, 36	A New Alaskan Race of the Winter Wren	37-74
hylaues, Geomys busarius	56	Lisianthus	131, 132, 133
Geomys lutescens	56	Lisianthus browallioides	132, 133
Hylella buckleyi	36	llanensis, Geomys breviceps	57
fleischmanni	36	Geomys bursarius	57
parambae	35	Llano, G. A.	
Hypentelium nigricans	94	Linnaeus and Uppsala University	ix
I			
Illg, Paul L.	x	longiforceps, Thaumapsylla	10, 12, 14, 15
illinoensis, Geomys bursarius	56	18, 21	
illinoensis, Aphis	51	Loveridge, Arthur	
imitator, Rheumatobates	155	A New Gecko of the Genus Gymnodactylus from Serpent Island	91-92
industrius, Geomys bursarius	57	ludemani, Geomys breviceps	58
Ioa vitrea	95	Geomys bursarius	58
irrasa, Microvelia	77	luianana, Microvelia	79
irritans, Pulex	19	lunatum, Trichopetalum	119, 122
Irving, Laurence		lutescens, Geomys bursarius	55, 56
Studies in Alaska upon physiological adaptation to cold	xi	Lycium parviflorum	50
J			
jani, Tantilla	98	M	
japonica, Ninox scutulata	41	Macrocarpaea	131, 133, 134
jardini, Glaucidium	66	corymbosa	134
Johnson, David H.		glabra	133
Member of Council	x	glaziovii	134
The Water Shrews of the Labrador Peninsula	109-116	guttifera	134
jugossicularis, Geomys bursarius	56	obtusifolia	134
Geomys lutescens	57	pachystyla	134
juniperensis, Cinara	46	rubra	134
Juniperus monosperma	46	stenophylla	133
utahensis	145, 146	subcaudata	133
K			
kelleri, Turdus poliocephalus	13	macrochirus, Leponis macrochirus	95
klagei, Rheumatobates	155	maguirei, Phylloscartes nigrifrons	70, 71
klossi, Dasypsyllus	13	major, Geomys bursarius	55, 56, 57
L		Geomys lutescens	57
labradorensis, Sorex palustris	109, 110, 111, 113	majusculus, Geomys bursarius	56
labradorius, Microtus pennsylvanicus	109	mandarinus, Turdus merula	135
Lachnus agilis	45	Mansueti, Romeo, and Howden, Henry F.	
sabinae	146	Fishes of the Tributaries of Anacostia River, Maryland	93-96
Lagopus mutus atkensis	63	margaritae, Glaucidium brasilianum	65, 67
nelsoni	63, 64	marginata, Microvelia	75
yunaskensis	63, 64	marmoratus, Gymnodactylus	91
lamottenii, Entosphenus	94	maxillingua, Exoglossum	94
laticeps, Eumeces	59, 60	maximus, Pipistrellus hesperus	106
lecontii, Brachycephalus	139	Meanley, Brooke	
Lehmanniella	131, 132	Carpenter Frog, Rana virgatipes, on the coastal plain of Maryland	59
splendens	132	Eumeces laticeps (Schneider) in the Alleghanian Zone of Maryland	59
Lepomis auritus	95	Natrix erythrogaster in the Austroprarian Zone of Maryland	60
cyanellus	95	mearnsi, Zenaida asiatica	83
gibbosus	95	medianus, Glaucidium brasilianum	66, 67
macrochirus macrochirus	95		
levis, Sebastodes	130		
levisagittalis, Geomys bursarius	56		
limaiana, Microvelia	79		
Limnogonus guerini	143		
Limnodynastes swainsonii	59		
Lincoln, F. C.			
Exhibition of new publication on migration of birds	ix		

- meinerti, Rheumatobates 155
 Merragata hebridoides 143
 merula, Turdus 135
 Mesovelina mulsanti 143
 Metrobates denticornis 143
 mexicanus, Rheumatobates 152, 155
 Microsorex 112
 Microtus pennsylvanicus labra-
 dorus 109
 Microvelina 75
 albonotata 143
 crinata 76
 hambletoni 77
 hinei 143
 irraso 77
 limaiana 79
 lujanana 79
 marginata 75
 munda 75
 recifana 78
 robusta 143
 rasilis 77
 rufescens 78
 summersi 75, 79
 venustatis 79
 minuta, Felis bengalensis 19
 minutissima, Aphis 50
 minutus, Rheumatobates 147, 154, 155
 Miopelodytes gilmorei 37
 mollis, Schilbeodes 95
 monosperma, Juniperus 46
 mulsanti, Mesovelina 143
 munda, Microvelina 75
 Mus bursarius 56
 musculus, Mus 26
 mutabile, Polyzonium 137, 139, 140
 Mydans 19
- N
- nanum, Glaucidium brasilianum 67
 Natrix erythrogaster 60
 navigator, Sorex palustris 110
 nebulosus, Ameiurus nebulosus 95
 nelsoni, Lagopus mutus 63, 64
 Neosorex palstris acadicus 111
 niger, Esox 95
 nigricans, Hypentelium 94
 nigrifrons, Phylloscartes nigri-
 frons 70, 71
 Phylloscartes (Leptopogon) 65
 nigro-maculatus, Pomoxis 95
 Ninox scutulata 41
 florensis 41
 japonica 41
 randi 41
 totogo 41
 Notemigonus crysoleucas cryso-
 leucas 94
 Notropis analostanus 95
 cornutus fornutus 95
 hudsonius amarus 95
 progne procne 95
 rubellus 94
 noveboracensis, Peromyscus leu-
 copus 26, 27, 28, 29, 31
 nyctalis, Aphis 52
- O
- Oberholser, H. C.
 Discussion of some early
 members of the Society,
 and its influence on biologi-
 cal work in the United
 States xi
- obscura, Chamaeza campanisona 68
 obscurus, Dendragapus 125, 126, 127
 oblongus, Erimyzon oblongus 94
 obtusifolia, Macarocarpaea 134
 ocellifera, Hyla 33, 36
 Ootookogona 120
 alia 117, 121, 124
 steuarta 117, 120, 121, 124
 olivaceum, Glaucidium brasilia-
 num 66, 67
 olmstedii, Boleosoma nigrum 95
 O'Neill, Hurgh, reelected Vice
 President x
 orientis, Ctenocephalides felis 19
 oreinus, Dendragapus obscurus 125
 Owens, Howard B., Member of
 Council x
- P
- pachystyla, Macarocarpaea 134
 pallescens, Citellus spilosoma 106
 pallida, Tingupa 117
 pallidus, Dendragapus obscurus 125, 126, 127
 Palmer, T. S.
 Early days of the Society x
 palosi, Rheumatobates 155
 palustris, Sorex 109, 110, 111, 112
 parabambae, Hyla 36
 Paradoxurus 13, 19
 parambae, Cochranella 35
 Hylella 35
 parca, Trigenotyia 117, 118
 Parkes, Kenneth C.
 The Generic Name of the
 White and Scarlet Ibises 61
 parviflorum, Lycium 50
 parvula, Cochranella 35
 Penstemon cordifolius 132
 Peromyscus leucopus novebora-
 censis 26, 27, 28, 29, 31
 meniculatus bairdii 25, 26, 27, 28, 29, 31
 Persia borbonica 59
 petasata, Brachygybe 147
 petilus, Rheumatobates 147
 phaloenoides, Glaucidium brasili-
 anum 65, 66, 67
 Phelps, William H. and
 Phelps, William H., Jr.
 Four New Venezuelan Birds 65-72
 Phylloscartes chapmani chap-
 mani 69
 duidae 68, 69
 (Leptopogon) nigrifrons 65
 nigrifrons maguieri 70, 71
 nigrifrons 70, 71
 Pinus arizonica 44
 Pipistrellus 105
 hesperus 105, 106, 107
 australis 106
 maximus 106
 potosinus 105, 106
 santarosae 106
 pini-radiatae, Schizolachnus 45
 pinnatum, Bryophyllum 48
 pitapapa, Aphis 49, 50
 Pinus ponderosa 44
 Plectrolyla 35
 Pletsch, D. J.
 The biological research sta-
 tions of Japan ix

Polyzonium	137, 139	rileyi, Rheumatobates	154, 155
bikermani	137, 138, 139, 140	robinsoni, Ceratophyllus	11, 20
bivirgatum	137, 138, 139	Pygiopsylla	11
mutabile	137, 139, 140	Stivalius	1, 2, 7, 11, 20
rosalbum	137	robusta, Microvelia	143
pomerantzi, Stivalius	1, 2, 4, 6, 7, 9, 11, 20	rosalbum, Polyzonium	137
Pomolobus pseudoharengus	94	Rousettus	19
Pomoxis nigro-maculatus	95	rubellus, Eudocimus	61
ponderosa, Pinus	44	rubidus, Gymnodactylus	91
potosinus, Pipistrellus hesperus	105, 106	rubra, Macrocarpaea	134
praeposterus, Rheumatobates	155	rubrivinctus, Sebastodes	130
pratincolus, Geomys breviceps	57	rubusta, Eonycteris	18
procne, Notropis procne	95	rufescens, Microvelia	78
prosoblepon, Centrolene	33	Russell, Louise M., Member of Council	x
Hyla	33, 36		
petrophilus, Troglodytes troglodytes	73		S
pseudoharengus, Pomolobus	94	sabinae, Lachnus	146
Pteropodus	130	sagittalis, Geomys breviceps	57
pulchella, Chironia	131	Geomys bursarius	57
Gentiana	131	santarosae, Pipistrellus hesperus	160
pulchellum, Centaurium	131, 132	Saunders, George B.	
Pulex irritans	19	A New White-winged Dove from Guatemala	83-90
pulverata, Cochranella	35	Sceloporus spinosus	101-103
pulverulens, Cinara	46	apicalis	101, 103
Pygiopsylla robinsoni	11	caeruleopunctatus	103
pygmaea, Umbra	95	spinosus	103
		Schilbeodes mollis	95
	R	Schizolachnus	45
raffus, Stivalius	6, 7, 8, 20	pini-radiatae	45
ramosissima, Erythraea	131	tusoca	45, 45
Rana virgatipes	59	Sciurus	11, 13, 19
randii, Ninox scutulata	41	scutalata, Ninox	41
rasilla, Microvelia	77	Sebastichthys sinensis	130
Rattus	7	Sebastodes	129, 130
rectifana, Microvelia	78	(Allosebates) sinensis	130
regius, Hybognathus nuchalis	95	elongatus	130
Rehder, H. A., elected Corresponding Secretary	x	levis	130
Rheumatobates	143, 147, 148, 149, 154	rubrivinctus	130
bergrothi	154	sinensis	130
bonariensis	154	zacentrus	130
carvalhoi	154	seguamensis, Troglodytes troglodytes	73
citatus	150, 155	Selander, Robert K. and Behle, William H.	
clanis	148, 155	A New Race of Dusky Grouse (Dendragapus obscurus) from the Great Basin	125-128
crassifemur	148, 154, 155	Semotilus atromaculatus atromaculatus	94
creaseri	150, 151, 155	corporalis	94
crinitus	147, 149	serpensinsula, Gymnodactylus	91
esaki	155	Setzer, Henry W.	ix
hungerfordi	149, 155	Sigmactenus	20
imitator	155	sinensis, Sebastichthys	130
klagei	155	Sebastodes	130
meinerti	155	Sebastodes (Allosebates)	130
mexicanus	152, 155	Smith, Philip W. and Smith, Hobart M.	
minutus	147, 154, 155	A New Snake (Tantilla) from the Isthmus of Tehuantepec, Mexico	97-100
palosi	155	A New Lizard (Sceloporus) from Oaxaca, Mexico	101-104
petilus	147	Sorex	112
praeposterus	155	cinereus cinereus	109
rileyi	154, 155	palustris	109, 110, 111, 112
tenuipes	155	albibarbis	109, 110, 112
trulliger	155	brooksi	110
vegatus	147, 149, 155		
crinitus	149		
wrighti	154		
Rhinichthys atratulus atratulus	94		
richardsonii, Dendragapus obscurus	125, 126, 127		
ridgwayi, Glaucidium brasiliannum	67		

glover-alleni	109, 110, 111 112, 113
hydrobadistes	110
labradorensis	109, 110, 111, 113
navigator	110
turneri	110, 113
sowerbyi, <i>Turdus merula</i>	135
specus, <i>Conotyla</i>	118
spinosa, <i>Centrolenella</i>	35, 37
Teratohyla	35
spinosa, <i>Sceloporus</i>	101, 103
Sceloporus spinosus	103
spiramus, <i>Stivalius</i>	13
splendens, <i>Lehmanniella</i>	132
spilosoma, <i>Citellus spilosoma</i>	106
Stannard, Lewis J.	xi
stannardi, <i>Flagellopetalum</i>	117, 120, 122
stenophylla, <i>Macrocarpaea</i>	133
stenartae, <i>Ofcoogogona</i>	117, 120, 121, 124
Stickel, William H.	25-32
Stivalus cognatus	13
pomerantzi	1, 2, 4, 6, 7, 9, 11, 20
radius	6, 7, 8, 20
robinsoni	1, 2, 7, 11, 20
spiramus	13
Stone, Alan, elected Vice President	x
striata, <i>Tantilla</i>	98
subcaudata, <i>Macrocarpaea</i>	133
summersi, <i>Microvelia</i>	75, 79
swainsonii, <i>Limnodynastes</i>	59
Swift, L. W., Member of Council	x
<i>Symplocos tinctoria</i>	59

T

taeniata, <i>Tantilla</i>	97, 98, 99
tahosalea, <i>Aphis (Wapuna)</i>	47
tanagensis, <i>Trogolodytes troglodytes</i>	73
tangalunga, <i>Viverra</i>	13
<i>Tantilla</i>	97
flavilineata	98
jani	98
striata	98
taeniata	97, 98, 99
triseriata	97, 98, 100
<i>Taxodium distichum</i>	59
Taylor, Edward H.	
Two New Genera and a New Family of Tropical American Frogs	33-40
taylori, <i>Trepobates</i>	143, 154
<i>Telmatometra</i>	141
whitei	141
ujhelyii	141
tenuipes, <i>Rheumatobates</i>	155
Teratohyla	35
spinosa	35
terricolus, <i>Geomys breviceps</i>	57
Geomys bursarius	57
tetrapteralis, <i>Aphis</i>	50
texensis, <i>Geomys</i>	57
Geomys bursarius	57
Thaumapsylla breviceps	12, 13, 14, 15 18, 21
longiforceps	10, 12, 14, 15, 18, 21
Tiganogona	120, 122
brownae	124

<i>tinctoria</i> , <i>Symplocos</i>	59
<i>Tingupa</i>	117
pallida	117
Tinton, Vernon J.	ix
tonaluca, <i>Cinara</i>	45
totogo, <i>Ninox scutulata</i>	41
Traub, Robert	
New data from Malaya on the epidemiology of scrub typhus	ix
Fleas Collected by the Chicago Natural History Museum Expedition to the Philippines, 1946-1947	1-24
trepidus, <i>Trepobates</i>	143, 154
<i>Trepobates</i>	141
taylori	143, 154
trepidus	143, 154
vazquezae	141, 143
<i>Trichopetalum</i>	119
album	119
cornutum	119
lunatum	119, 122
uncum	119
<i>Trigenotyla</i>	118, 119, 122
parca	117, 118
triseriata, <i>Tantilla</i>	97, 98, 100
<i>Trogolodytes troglodytes pterophilus</i>	73
seguamensis	73
tanagensis	73
trulliger, <i>Rheumatobates</i>	155
Tupaia	11, 13
tucumanum, <i>Glaucidium brasiliense</i>	67
turdella, <i>Hoogstraalia</i>	20
<i>Turdus merula</i>	135
mandarinus	135
sowerbyi	135
poliocephalus kelleri	13
wulsini	135
turneri, <i>Sorex palustris</i>	110, 113
tusoca, <i>Schizolachnus</i>	43, 45

U

ucayalae, <i>Glaucidium brasiliense</i>	67
ujhelvii, <i>Telmatometra whitei</i>	141
Umbra pygmaea	95
uncum, <i>Trichopetalum</i>	119
uranoscopy, <i>Cochranella</i>	35
Hyla (Hylella)	36
utahensis, <i>Juniperus</i>	145, 146

V

valerioi, <i>Centrolene</i>	36
Cochranella	35
vandoisulus, <i>Clinostomus</i>	94
vazquezae, <i>Trepobates</i>	141, 143
vegatus, <i>Theumatobates</i>	147, 149, 155
Velia brachialis	143
venezuelana, <i>Chamaeza campnisona</i>	68
venustatis, <i>Microvelia</i>	79
Viguiera cordifolia	52
vinaceus, <i>Geomys bursarius</i>	56
Geomys lutescens	56
virgatipes, <i>Rana</i>	59
vitrea, <i>Ioia</i>	95

viridissima, Cochranella	35	wrighti, Rheumatobates	154
Viverra tangalunga	13	wulsini, Turdus	135
W			
wahhaka, Cinara	145, 146	X	
Wapuna	47	Xiphoveloidae	77
Wehrle, L. P. and Hottes, F. C.		Y	
Two New Species of Lach-		yavii, Chamaeza campanisona	68
nini (Aphididae) from Ari-	43-46	yunaskensis, Lagopus mutus	63, 64
zona	47-54	Z	
Arizona Aphididae		zacentrus, Sebastodes	130
Wetmore, Alexander		Zenaida asiatica	85
Barro Colorado Island, a jun-		alticola	83, 85, 86
gle laboratory in the Pan-	ix	asiatica	83, 85, 86
ama Canal Zone		mearnsi	83
Recollections of early days	x		
of the Society	141		
whitei, Telmatometra			